THE IRON AGE

A Review of the Hardware, Iron, Mach[illegible] l Trades.

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Reading Matter Contents .....page 67
Alphabetical Index to Advertisers " 167
Classified List of Advertisers ... " 160
Advertising and Subscription Rates " 97

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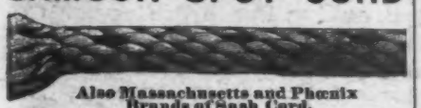

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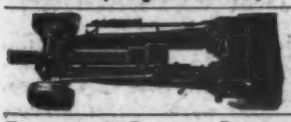

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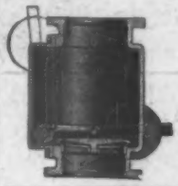

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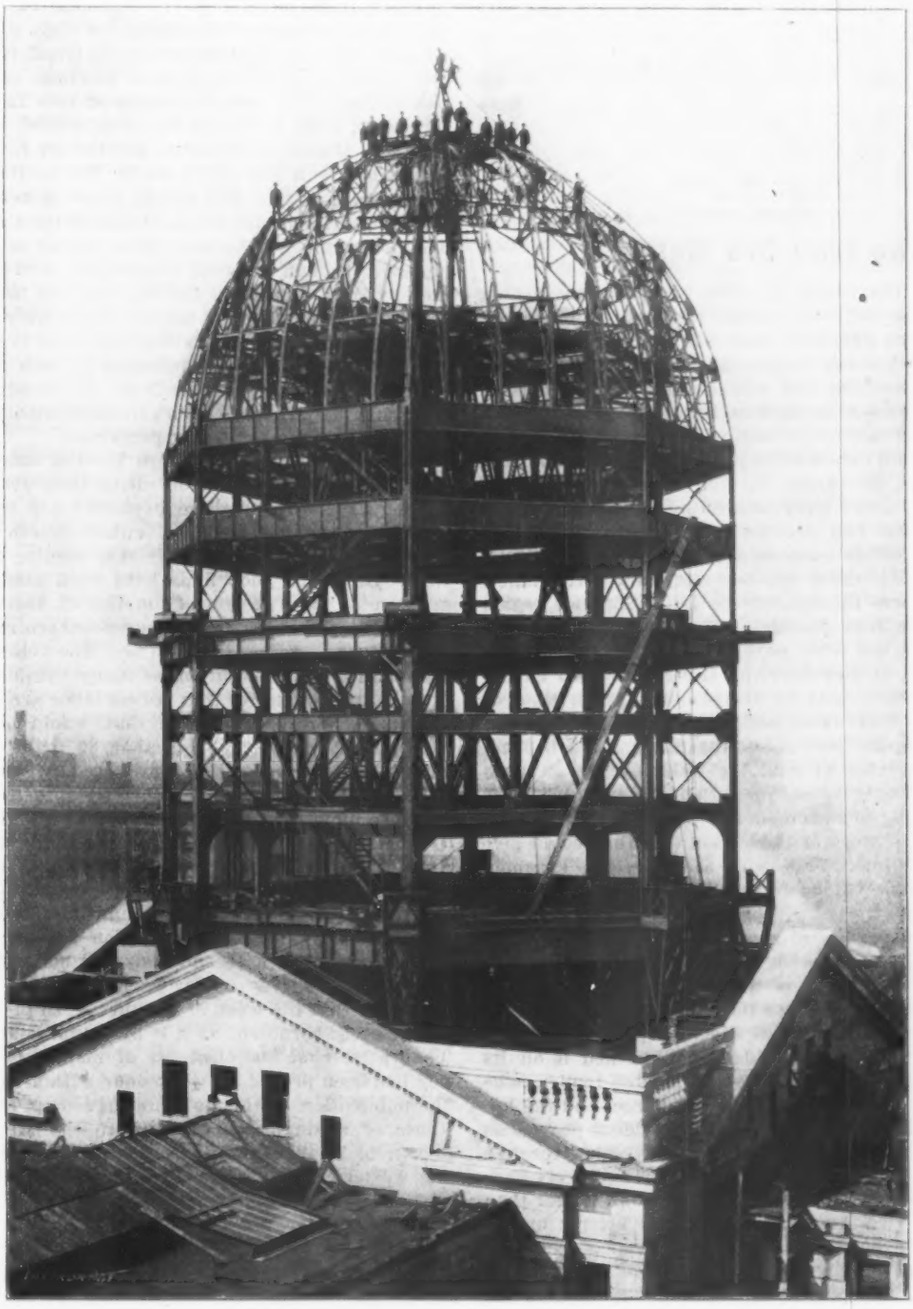
THE IRON AGE

THURSDAY, JUNE 19, 1902.

Dome of the New Chicago Government Building.

The accompanying illustration shows the steel construction of the dome for the new building now being erected in Chicago which is to be used for post office and other purposes of the United States Government. This building is of a totally different design from the conventional Government structure in our large cities. It fills an entire block. The main structure is in the form of a Greek cross, each of the four arms being six stories high, the corners being filled to the hight of two stories. From the center of the pile rises a dome.



THE DOME OF THE NEW CHICAGO GOVERNMENT BUILDING.

The building consists of steel frame work with a facing of granite. The contractors for the erection of the frame work were originally the Hansell-Elcock Foundry Company of Chicago and the J. G. Wagner Company of Milwaukee. These two companies worked in co-operation with each other until the absorption of the J. G. Wagner Company by the American Bridge Company. Since that time the Hansell-Elcock Foundry Company have had exclusive control of the steel construction. A noteworthy point in the completion of the building was reached a short time since, when the frame work of the dome attained its full hight. This is the stage reached at the time the photograph was taken, which

was used for our illustration. The total quantity of steel used in the construction of this building is about 10,000 tons, of which the approximate quantity used in the dome was 1200 tons. The frame of the dome is of truss construction, each truss carrying three floors. Four trusses of 20 tons each and 8 plate girders of 10 tons each were utilized. The size of the beams used in the dome ranged from 5 to 24 inches. The hight of the dome above the roof of the main building is 167 feet 9 inches. The perpendicular hight of the arch line is 76 feet 6 inches. The distance from the ground to the top of the dome is 295 feet 4 inches. The diameter of the dome at the widest part is 94 feet 2 inches. A flag pole 50 feet in hight extends above the dome. In hoisting the material for the construction of the dome a steam crane at the top was used, all material being hoisted through the center. The arches were raised in sections and assembled at the top. The dome will present a striking appearance not only by reason of its great size, but also because of its ornamentation. It will be covered with tile overlaid with gold leaf. Huge copper eagles will be used as a frieze at the base of the arch, each of which will be 16 to 18 feet high, with 23 feet spread between the tips of the wings.

Lake Iron Ore Matters.

DULUTH, MINN., June 13, 1902.—Preparations are in active progress for the annual meeting of the Lake Superior Mining Institute, that will convene in Duluth and on the Minnesota ranges in August for its regular session. The meetings for business and for the presentation of papers will be held at Duluth, and the tour of the ranges will take place during the week. A special train of Pullman cars will be provided for the members, and these will be carried by the railroads in such a way as to cover the more interesting points of the district very fully. The meeting is expected to be one of the most interesting sessions ever held by the institute, and it is probable there will be a very large attendance, both of members throughout the Lake Superior region and of others from outside. The customary date of meetings is in the early part of the year, and that of 1901 was held in February, at Houghton. An earlier meeting had been held in Minnesota at such time of year that no very exact survey of open pit or other operations singular to the Mesaba range could be had, and it was decided to hold the 1902 meeting at such time that not only would operations be in full swing, but that mining superintendents would be far enough along with their work of the season that they could give time to the visitors. This being the case, it is expected that the session will be especially interesting and full of information.

Lake shipments of ore have been hampered the past two weeks by the blockade at the Sault canals. This blockade was the result of an accident to the international railway bridge across the canal above the American locks; the United States Steel Corporation's barge "Madeira" ran into the bridge and knocked it off its settings. This was the fault of the bridge tender, who did not swing the bridge open for the barge, and the latter was unable to stop. The trifling accident proved an object lesson of the importance of navigation through the canals on both sides the river, as during the six days of the blockade the Canadian Canal, though longer than either of the two American locks, was utterly unable to care for the business. Before the bridge was swung into position, after six days, the press of ships at the Canadian lock had become so great that more than 100 vessels were tied up, and the number was increasing by a score or more daily. This, though the canal was worked continuously and with the utmost speed. This delay to ships resulted in placing but few boats at ore docks for the week, and traffic was slackened clear back to the furthest corners of mines. Now the difficulty has been remedied and boats have been running, but they have become so bunched that trouble will be occasioned for some time. June this year will not pass the freight that the same month did in 1901.

There is a great deal of talk in local papers and elsewhere of the finds that are being made north of the international boundary line, on Steep Rock Lake and in a region running westerly from the Atikokan range. Much of this talk has been based upon very unreliable information, and it is probably safe to say that until there is a great deal more information the reports are to be placed in the "important if true" class. Exploration is under way there on a considerable scale, and by the fall much should be known.

Ore dock work for the Great Northern road at the head of Lake Superior is completed for the year, and the road now has two docks, the larger of which is 1500 feet long, 73 feet high to track deck and 65 feet wide, with a storage capacity of 86,000 gross tons. Though not the longest, it is the largest ore dock in the world. Changes are being made in the management of the J. J. Hill ore interests, necessitated by the purchase of the subordinate Eastern Minnesota road by the main system. The Eastern has been that portion of the Great Northern system through which the freight business of that great line of roads has been concentrated into Lake Superior terminals, both from the transcontinental line, the St. Paul and Minnesota branches and the ore range division. Consequently it has had a traffic far greater than that of the main system, and almost equal in density to that of the most important freight roads of the United States. The ore traffic will be maintained under separate management, though the road is absorbed, and will be handled by D. M. Philbin of Duluth, who has been in charge for years, as manager of mines. The road will probably continue to offer properties they can mine to independent mining and steel making interests in such a way as to permit them to enter the ore field. The road is not, however, making any more such contracts with mining companies as it did make a few years ago.

The activity on the Western Mesaba range, in Itasca County, continues, and more drills than ever are going in there. Many of these explorers are men without knowledge of the business, either practical or theoretical; and it is not probable that results will be startling. But some good finds have been made and more are sure to be. The ores of the district, though lean and sandy, are far better than many Southern ores, and are sure to come into use in due time. The field is about the last chance for exploration, so many consider, upon the Mesaba range, and for that reason lands are more or less thoroughly prospected there that would otherwise be disregarded. It is probable that 30 drills and double that number of test pitting crews are now working there, from the Mississippi River easterly into town 57-22, a distance along the formation of about 18 miles.

The United States Geological Survey, that last year finished the mapping of the Mesaba range as far west as the center of range 21, is at work again checking up its former operations, and extending its completed surveys westerly along the formation toward the Mississippi. This done, a second map will be issued carrying the valuable survey as far as possible. It is quite remarkable that the work of the survey, so far as mapped, is so closely borne out as it is by actual field operations. Time after time the closeness of mappings by the survey has been proved by work done with great care after the publication of the Government's map, and I do not know of a single instance where the map has been shown to be inaccurate to any considerable extent. If the western end of the range is mapped as closely the survey can well claim a triumph. D. E. W.

The Largest Cantilever Bridge.

The cantilever bridge now being erected across the St. Lawrence River at Montreal will have a length of 1800 feet for the central span, which is 90 feet longer than the present Forth bridge in England. The two shore spans will be each 500 feet in length. The bridge will be 62½ feet wide and will carry two steam railway tracks in the center and a single electric railway and highway on either side. From the top of the caisson to the coping the piers will be 57 feet high, and the highest point of the superstructure above the coping will be 330 feet. The piers are of granite backed with concrete

and the towers are of steel throughout. It is expected that the substructure and shore spans will be completed by the end of the year.

The College Man in Industrial Works.

BY W. F. LAKE, BUFFALO.

A survey of the foremost industrial establishments of this country need not be more than casual to determine the prominence of positions held by men of technical training. Naturally, there will always be found those who are lucratively employed as a result of influence or relation, but the remarks of this article refer only to those who attain distinction solely as a result of their worth. To-day we find a growing tendency to recognize that men from the scientific schools are of appreciable value to the progressive industrial institution. A most forcible illustration of this fact is the existing condition at the best engineering schools this year—namely, that they have calls for many more graduates than are being turned out. These men enter the manufacturing world with the authority of the college to affix M.E. or B.S. to their names. Many of them, with the intutition of good judgment, inborn or possibly acquired at the university, omit the title until it shall have been earned by some years of practical experience.

A more kindly feeling in general exists toward the technical man in the machine shops, the drafting rooms and other departments of works than there did years ago. Yet, withal, a good deal of prejudice against their cause still prevails in some establishments. This will continue to steadily decrease proportionally as the standard of intelligence of working mechanics is raised. For this evolution thanks are due in a large measure to the correspondence schools and the evening classes in mechanics conducted in the large cities.

The writer has recently visited a number of the leading engineering schools throughout the country, and an examination of the various college enrollments shows a larger number entered on the list of engineering students than ever before. The colleges are erecting new buildings and providing for larger increases in enrollment than ever before. While the commercial world is enjoying at present a period of unparalleled prosperity, it is not due to this entirely that the college bred mechanic finds ready employment at the completion of his course. It is safe to say that this phenomenal growth and development of trade does not in any measure compare with the increase in the total number of men graduated in mechanical engineering who are well placed with manufacturing houses. The reason is apparent. As a net result their services are found valuable, not only in working toward a maximum factory output at minimum expense and time, but in other work in the establishment.

If the original idea of schools of mechanical technology was only to train men to a high standard for shop work, then the ultimate usefulness of such institutions was not apparent at their inception. It is true that not many years ago there was little or no thought of the senior students entering the business department of a manufacturing institution, and the college faculties did not advance the idea nor endeavor to so locate their men. But to-day we find the technical man doing very effective work in the executive departments of business. As an engineer salesman, often his record is a good pace setter for those of longer experience. His ability to conceive an efficient installation on reviewing the conditions to be met and familiarity with technical and mechanical detail of the plant are fruitful factors. This has been but a natural outgrowth.

There is essentially a great distinction between the business world and the university. So the college graduate should be taken at the outset as he is, an employee without experience, but having a foundation upon which may be built a most efficient career. From the time he enters the office door he must build upon that foundation, following the ideas and suggestions of his employer. The first year, or more it may be, is practically a post-graduate course, adapting him to the specific line of his employer's business. He will appreciate the close personal relation with men capable of guiding his steps, who realize his difficulties and can stimulate his efforts. The credit of that employee's success is the employer's as well as his own. The employer looks for and receives a great deal of originality of thought and treatment of mechanical subjects from technical men. Close relationship with the active business department tends to mold and develop these qualities into lines of ultimate commercial value.

From the English point of view it is observed that the American college president is essentially a business man; that he runs the halls of learning like a great factory; that he appoints instructors who know that they must do certain work during the term sufficient to bring out their best energy; that their vacations will be so occupied as to inject new vigor into their work the following season. This is the machinery of the institution. But however good that machinery is, or the degree of perfection it may in future reach, it may never be expected to wholly fit the college man to the work he is to pursue.

The requests for men from manufacturing establishments which are made to collegeiate institutions are interesting. It must be admitted that a good many of them show a lack of forethought as to what is to be done with the men. As an example, the writer saw one letter from a manufacturer of small machines and tools requesting a dozen men. The correspondent gave no clue as to what the men were expected to do, what would be their opportunity for advancement, or anything that could interest a man who had spent four years in active study and incidentally laid out what is to him, if he has had to earn it, a great deal of money. In another instance the manager of a growing electrical firm desired to employ the entire graduating class of a mechanical college. It is possible that he intended to turn these men loose about his plant, in which case there is no doubt but that some of them at least in due course would have made their services felt. Similar propositions are annually made to technical schools by a number of the largest American industrial institutions. This willingness to "take the goods without seeing them" shows a wholesome interest in the product of the mechanical schools. But this is scarcely the ideal way of making engagements. The student of to-day, who completes a course involving an exacting curriculum, intuitively has the idea of investigation and discrimination. His training encourages him to acquire this. If he has not a fully formulated plan of the work he is to enter after commencement, he will at least examine very carefully into whatever may be offered before coming to a conclusion.

A higher moral and scholastic standard for graduate mechanical engineers is fixed by the college and demanded by the business world at the present time than at any previous period, and it is still on the upward trend. The requirements in class, the general college influence and the very atmosphere of the campus combine to encourage this growth. But since the inception of the world men have occupied different stations as a result of varying energy and resources, and the college man is no exception. His education can never wholly change his nature. No hall of learning will ever evolve itself into a marvelous machine through which characters and brains of all kinds may pass and turn out a perfected product in every particular.

The erection of the new West Allis shops of the Allis-Chalmers Company has been seriously delayed by the slow delivery of structural steel. The contractors are now at work on the pattern shop and foundry. The company have about 40 machines in operation in the first shop. The steel work for the erection shop and a portion of the brick work is completed. This is also true of the second shop, and the third is well advanced, and in the course of 10 or 15 days the steel work for the three units, including the erecting shop, will be completed. A description of the novel arrangement of these shops was printed in *The Iron Age* under date of February 28, 1901.

The Molding Machine.*

BY S. H. STUPAKOFF, PITTSBURGH, PA.

Flasks.

Talk to a foundryman about flasks and you will touch another sore spot. No wonder, for flasks are a continual drain on the exchequer. Founders will tell you that if it were not for the cost of flasks there might be some profit in the business. They admit that they are a necessity, but invariably think them an unavoidable nuisance, a source of constant annoyance, loss and expense; and, in fact, the greatest evil of the foundry. It is often thought that every cent spent on the construction and maintenance of flasks is just so much money thrown into the gutter.

But luckily, all the opinions on this subject do not run in the same direction. There are many founders who have gone through it who hold and prove that bad flasks give bad results, are false economy and point to poor judgment. They argue, and justly so, that money spent judiciously for a good flask equipment, especially for a good set of stock flasks, and a liberal sum set aside and used for their maintenance, is a good investment. An expenditure of this kind is mainly a matter of first cost, and is fully justified by the results.

The founder who knows a good thing when he sees it will also know how to take care of it. He will not permit his flasks to be abused and thrown out into the yard, where they are exposed to the deteriorating effects of the weather. He will keep them under roof and guard them against all possible damage. Nobody will question the fact that bad flasks are more than likely the principal cause of loss of time and of castings. Yet how many are there who will anxiously try to save and stint in this direction ? Give your molder good material, good facilities, and above all, let him have good flasks, and you have a right to expect a good day's work, and that of good quality.

Good flasks are especially important in machine or plate molding. In fact, to insure good results from molding machines the flasks used must be practically perfect. They should be constructed so as to insure a firm holding of the molding sand. They should be made stiff, light and durable. The flask pins should be accurately fitted. If flasks are made in sets they must be absolutely interchangeable. When copes and drags are put together they should not rock or shake sideways. The pins should be firm and square with the flask surface; and while they must not bind, on the other hand they must not fit too loosely.

Ordinary shop made wooden flasks, such as are used in most foundries, are not likely to give good results in molding machine practice, but if carefully and substantially made and perfect in all other respects there is no reason why their application in machine molding should be absolutely condemned.

Iron flasks are always preferable, more especially because they do not shrink, warp or get out of joint. Pressed steel flasks, if they could be procured, would answer still better. If wooden flasks are used they should be provided with an iron ring at their face, which ring should serve not only as a tie and alignment, but also as a base for securing the flask pins.

Flask Pins.

Turned tapering flask pins give the best satisfaction in flasks for machine molding. Part of the pin is usually turned down to a square shoulder with a thread at its lower end, the cylindrical portion is fitted into a corresponding hole in the flask lug and permanently secured thereto by a nut. A better way is to ream tapering holes in the flask lugs, make the lower ends of the pins accordingly and drive them lightly into place. Thus a few pins will answer for any number of flasks, as they can be removed as soon as the flasks are closed and clamped together. Greater care can thus be bestowed upon their production, as the increased cost is but a small item, and when not in use they can be easily removed from their sockets and bolts, flasks and pins can be easily and properly taken care of.

A convenient way to remove such taper shank pins is shown in Fig. 1. A piece of flat iron or a flask clamp is used as a lever by placing it between the lower end of the taper shank and the rounded top edge of a fulcrum lug, which may form a part of the side of the flask, and which should be located 1 or 2 inches out of alignment with regard to the center line of the flask pin. A prolongation of these lugs may also form the handle of the flask. A slight pressure or a light tap with the hammer will loosen the pins from their sockets, whereupon they may be easily withdrawn. The B. & S. Standard is recommended as the most suitable taper for these taper shank flask pins. Accurate reamers are always obtainable in exact duplicates, and their use insures absolute uniformity.

It may not be out of place to caution against the maltreatment of the ends of these flask pins, which is bound to cause trouble and annoyance. There is not much likelihood to injure the pins if mallets of either rawhide, wood, lead or copper are used for driving them in or out. As an additional precaution, to protect them from injury it is desirable to have them case hardened. Care should be taken that the flask pins do not spring or bend during the hardening process; if they do, this fault should be corrected before they go into service, for

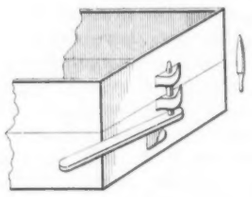


Fig. 1.
Removing Taper Shank Pins.

Fig. 2.
How to Use Round Pins.

THE MOLDING MACHINE.

bent or sprung pins are unfit for use. Little or no trouble will be experienced with good tool steel pins.

It is common practice to arrange the flask pin lugs in such a manner that a space of about ¼ inch or more is left between them when the flask is closed. Thus, no attention need be paid to the small quantity of molding sand, which inadvertently collects and packs around the base of the pins while the flask is being filled, but which would otherwise form an obstruction in the closing up of the flask. These spillings must be removed if the faces of the lugs are on a level with the parting edge of the flask.

It is sometimes troublesome to close or open flasks which are provided with well fitting round flask pins, as molding sand or dust will unavoidably adhere to them. This difficuty may be overcome to a great extent by removing a portion of the cylindrical part of the pin by either flattening or grooving, as shown in the cross section, Fig. 2.

Constant use of flasks of this kind will eventually wear out not only the flask pins, but also the sockets of their corresponding mates. They cannot possibly be kept absolutely clean, and the sand will keep on cutting until the defect must be remedied. It is an easy matter to exchange the worn out pin for a new one, but it is not so easy to correct the fault in the flask pin socket, unless, indeed, it was provided with a removable bushing in the first place. This, when necessary, can be replaced with the same facility as the pin. This is a point but rarely observed. To get perfectly satisfactory service out of a flask it is, nevertheless, quite as important a matter as all the others which were mentioned above.

The makers of molding machines are undoubtedly very well aware of all the requirements, which are covered by the observance of these little details; they will appreciate their importance and must admit that they are essential to make their machines a success. Yet to my knowledge these facts have never been mentioned. Is this information kept from the founder purposely, that he may not be scared from the purchase of ma-

* Read before the meeting of the American Foundrymen's Association, Boston, June, 1902.

chines? If he should be told all this he might, in the first place, think of the expense, and next that his molders cannot get used to refinements of this kind—which, by the way, is not a very creditable opinion. But if he buys one or more of the machines offered he cannot help finding all this out before long, to his own chagrin. By that time, perhaps, he has made up his mind to throw the thing in the scrap pile, or, if he persists, because he knows that others have succeeded, he will be compelled to pay dearly for his experience. He could have had this experience in the first place, and at a reasonable price, had he been furnished not only with the machine, but at the same time with jigs, sample flasks, pins, &c., and, above all, with necessary information to which he was justly entitled.

It should be taken into consideration that not all founders, foremen and molders are expert engineers or machinists, nor can they be expected to be fully versed in all the intricacies of machine design, mechanical laws and movements. To convince them and to demonstrate that machine molding is superior in every respect and more economical than the process of hand molding, in which line they themselves are experts, they need all available assistance, and must be taught from the very beginning the principles of the construction of the machines, the scope of their utility, their application and the importance of accessories and the essential parts in all minor details. Many failures to introduce the molding machine into foundries, to establish and to maintain their reputation as labor savers can be traced to the lack of intelligible instructions sent with them by their makers, and be it intention or neglect, the withholding of this information does more or less harm to all parties interested, and retards the world's industrial progress.

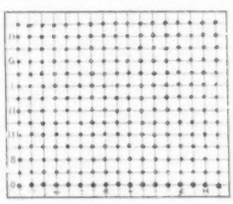


Fig. 3.—Plate with Guide Pin Holes.

Fig. 4.—Test Pin.

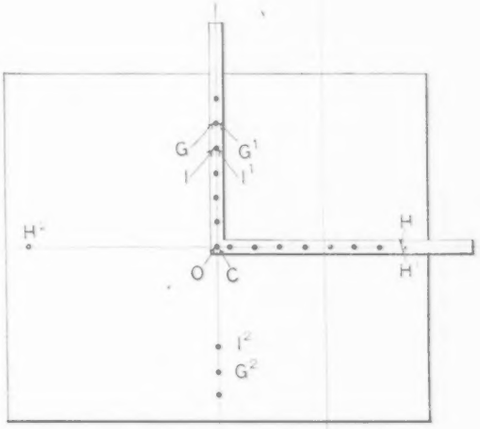


Fig. 5.—Finding Center of Plate.

Jigs.

The deduction arrived at in the foregoing chapter might make it appear that plated patterns are not likely to find an extensive use in jobbing foundries, whereas this is really not altogether the case. There is no doubt that plate molding in its present shape, or rather as ordinarily applied, is practically excluded from jobbing shops. But if a plate is used in connection with a suitable jig, specially prepared for the purpose, objections are not only overcome, but the application and use of plates offer excellent advantages, even in such cases where only a small number of castings of the same pattern are required at one time. At best, the economic use of plated patterns is limited by the shape and size of the castings. The fundamental principle involved in their construction and application must be fully understood by the user, if satisfactory results are expected.

Irrespective of its relation to the molding machine, it would seem that this subject—on its own merits—is of such importance that it should be investigated by all foundrymen. It should specially interest the majority of our members. I have therefore somewhat enlarged the scope of this treatise on the molding machine by including a detailed study of the construction and *modus operandi* of this particular contrivance.

To begin with, it should be understood that all plates are provided with guide pin holes, which are accurately fitted to corresponding guide pins forming part of the flasks. Unless special flasks are used in connection with such plates the customary flask pins should not be confounded with these guide pins, as they will never answer the purpose. In order that misconceptions in this respect may be avoided, this term will be adhered to in what follows, and strict distinction will be made between flask pins and guide pins wherever they may be mentioned in the course of this work.

The guide pin holes G and G¹, Fig. 3, are preferably arranged on opposite ends of the plate, in even multiples of an inch, and equidistant from its center and on a line dividing the plate into two equal rectangles. There are exceptional cases in which three or four guide pins must be used. The most serious objection against this arrangement is the greater difficulty experienced in locating the patterns correctly.

Accuracy in preparing the plates becomes of the utmost importance, as the magnitude of all errors occurring in the original laying out is doubled by each subsequent operation. The guide pin holes should be drilled and reamed out at right angles to the surface of the plate, and it is advisable to provide them with hardened and ground steel bushings. All guide pins should be of uniform diameter irrespective of the size

THE MOLDING MACHINE.

of the plate. A pair of test pins should be kept on hand, which snugly fit the guide pin holes; one-half of one of their ends should have been cut down to about ¾ inch in length, leaving as remainder exactly one-half of the cylindrical portion, Fig. 3. If these test pins are inserted into their respective holes and a straight edge be placed against their flattened faces it will serve for locating the base or the center line of the plate, for marking off and laying out the dowel pin holes, arranging the patterns and checking off all work relating to it.

The exact location of the center of the plate, and likewise the center of the flask, is found by dividing the base line from center to center guide pin hole into two equal parts. Let us drill a hole, C, in this place, Fig. 4, and let this hole serve as the starting point for future operations. Now we will assume that we have procured a try square with a row of holes drilled in each of its legs; these holes are spaced equally—say 1 inch apart—care being taken that each row stands exactly in a straight line, and that both rows include an exact angle of 90 degrees. We place this square in such a manner on our plate that the hole in its apex corresponds with the center hole C of our plate, and insert a good fitting dowel pin through both. Thus we are able to shift the square over the whole surface of the plate by turning it around the center pin. Next we bring one leg of the square over the base line of the plate and insert a second dowel pin (which may be shouldered if necessary) through G into the corresponding hole of our square. Secured in this manner the square should be absolutely rigid and should not shake to right or left on the surface of the plate. We now drill one hole each into the plate through the guides

H and 1 of the square, then we remove the pin from G, turn the square around the center pin over 90 degrees, so that one of its legs points upward and the other one to the left, insert a dowel through the hole in the leg pointing upward into the top hole I^1 of the plate, and drill the hole H^2; finally we turn it again over 90 degrees, secure it in the same manner as before, and drill the hole I^2. Fig. 4 illustrates the square in the first position as located on the plate; the holes H^2 and I^2, which are drilled subsequently, are shown in faint lines. We shall call these holes, in the future, "pilot holes," in order to distinguish them from others in the same plate. These four pilot holes include an exact rectangle or square, and each opposite pair is located at uniform distances from the center of plate and flask. It will be understood that it is not absolutely necessary to employ the square for drilling the pilot holes. For instance, after one plate has been prepared in this manner this plate can serve as a jig for drilling any number of additional plates in the same manner by a single setting. Such an original or master plate is especially serviceable if all holes are provided

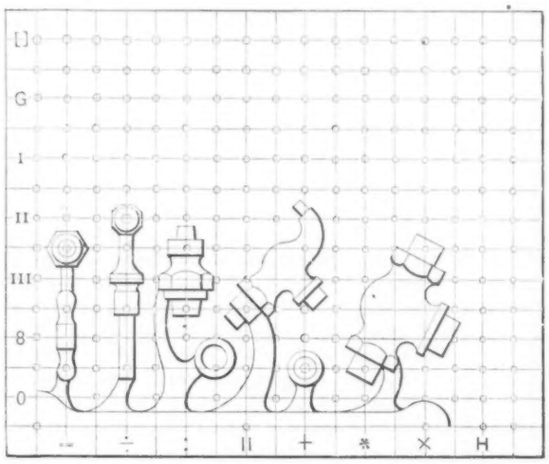


Fig. 6.—Jig.

Place this jig in such a manner in one corner of your draw plate that the hole O, Fig. 3, corresponds with the hole C in its center, hold both together with dowel pins inserted into the pilot holes, and drill the holes through the jig into your plate, which are required for securing the patterns in the predetermined places. To avoid mistakes be sure that the hole in that particular corner of the jig which corresponds to the one described as located in the apex of the square is distinctly marked on both sides of the jig plate—in our figure marked O—and note carefully which holes in the jig were used for drilling the dowel holes into the pattern plate. Thereafter turn the jig upside down on the pattern plate, insert the dowel pins again through the same holes, O and OI into C and I^1, and the third one through OH into H^2, and then, as before, drill through the same guide holes of the jig corresponding dowel holes into the second quarter of the pattern plate. Repeat the same process at the lower half of the plate, being always careful that C and O remain together, and your plate is ready to receive the patterns.

That there may be no doubt as to the method of operation, I suggest that you will refer to the two plates, Fig. 6 and Fig. 7. The cut on the former represents the jig. In faint lines thereon is shown the outline of the position of patterns, which corresponds to the arrangement of the same on the pattern plate, Fig. 7.

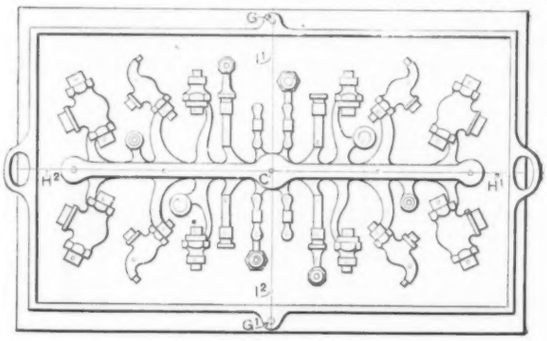


Fig. 7.—Pattern Plate.

THE MOLDING MACHINE.

with good steel bushings. The pilot holes in connection with the center hole will serve us hereafter as guides for locating pattern dowels.

Our object in view is to use this plate as a base for any and all suitable patterns, and as an illustration we will arrange it for the reception of patterns of a globe valve and a bib cock. We will assume that the patterns are all in good shape and properly parted. However, they shall originally not have been intended for use with either molding machine or drawplate. Our plate and flask are of a suitable size, but the job is in a hurry—as all jobs are—and we must get out quite a number of these castings to-day. What are we going to do about it? Take my advice and make it in the old fashioned way, unless you are provided with a suitable jig plate and an inexpensive but a good small drill press, which was never used by your blacksmiths or yard laborers, but was expressly reserved for this purpose only, was always under the care of a mechanic who understood how to handle it and who took pride in keeping it in good shape.

This jig plate, Fig. 3, should be provided with a number of holes, two rows of which, at least, are drilled exactly in the same manner as those in the above mentioned square; the balance are laid our preferably, but not necessarily so, in straight and parallel lines, all equidistant from each other. Its dimensions should be sufficient to cover one corner, or one-fourth, of your pattern plate.

If these things are part of your equipment you will have easy sailing, and you will be better fitted to tackle the job than your competitor.

Horizontal and vertical lines, which are provided with identification marks, cross all the holes in the jig plate. The holes which are to be used in this special case as guides for drilling the necessary dowel pin or screw holes in the pattern plate are indicated by circles drawn in heavy. Thus, the holes II × and 8* are used for securing the globe valve body pattern, II + and III || for the body of the bib cock, and so forth. By placing Fig. 6 in such a manner over the drawing of the pattern plate, Fig. 7, that its hole O corresponds with the center hole C of the latter, and OI and OH respectively with I^1 and H^1, it will be noticed that the outlines representing the patterns cover each other in both cuts. The jig placed in this position over the pattern plate, and secured to it by the pilot pins at O, OI and OH, is used in this manner for drilling all dark lined holes in the right hand upper corner of the draw plate. This being done, the pilot pins are withdrawn and the jig plate is reversed and turned into the upper left hand corner of the pattern plate, just as if it were hinged at the line OI, the pilot pins are replaced into the same holes of the jig as before and in this position they will secure it to the pattern plate by entering its pilot holes C, I^1 and H^2. It will be observed that in this position also, and equally well, the outlines of the patterns in both cuts fall exactly together. The jig is used in this position as before; the same guide holes which were used in the first position in the upper right hand corner serve again as guides for drilling the second quarter of the pattern plate. Identically the same process is then repeated at the lower left hand and lower right hand corners of the plate, by first turning the jig plate

around the imaginary hinge center OH and then around OI.

In order to prepare the patterns to suit the above conditions we proceed exactly in the same manner, by securing one-half of each separately, and always the one which has the dowel holes at the previously determined place on the jig plate, and drilling clear through them the holes which coincide with those drilled previously into the pattern plate. The second halves of these patterns are then placed in position against the first (drilled) halves; they are prevented from moving sideways by their original dowel pins, and they may be held together by suitable clamps. These clamps are preferably made of a universal type which adapts them for use with all kinds of patterns, their lower portion being constructed in the shape of a frame which rests on the table of the drill press without rocking and which is adapted for fastening the patterns in such a manner that their parting faces stand parallel to the drill table. The half of the pattern which has been drilled first with the aid of the jig occupies the upper position in this clamp or drill frame, and the holes in this one will now serve as guides for the drill to drill the holes in the second half, which stands directly underneath. Finally have the original dowel pins of the patterns removed and fasten all parts separately in place on the pattern plate by either dowels or screws, or both, whichever may be preferable and most convenient in your particular case.

If I may call your attention again to the drawings, you will observe that we have prepared the pattern plate in this manner with four complete sets of patterns; yet we have used only two. The castings resulting from the use of these plates should be perfect as to match. The amount of labor required to withdraw the patterns from the sand is reduced to a minimum, additional time is saved by the use of a stationary gate or runner on the plate, and double the quantity of castings can be produced in this manner with the same number of patterns and in the same number of flasks. All this can be accomplished by making an effort of no longer duration than it took to describe.

If you have followed the above description carefully you may have noticed that it is not necessary to have an individual plate prepared for each set of patterns. Yet I thought it better to describe this method of preparing pattern plates and patterns for plate molding in detail than to leave room for any doubt or error. You can easily see that much of the time which it apparently took to get the plate and patterns ready for the molder can be saved by providing the entire surface of the plate with dowel holes before putting it into use. This should be done with the aid of the jig and in identically the same manner as has been sufficiently explained in the foregoing. Thus only new patterns have to be prepared for the purpose, and all others, which once have been fitted, are easily replaced and secured to their correct positions on the plate, providing their dowel holes were promptly provided with specific numbers, letters or identification marks. The additional holes in the plate will not impair its working qualities, but they could be easily closed up with beeswax if objectionable. Finally, it is well worthy to note that each plate can be used in connection with all patterns within its range, and that it can be kept in continuous service, while the patterns may be changed at will, and as often as desirable.

While the above description may appear somewhat too extended, I assure you that a serious mistake would have been made had the subject been slighted merely for the sake of brevity. At the same time I will say, in justification of my apparent digression, that my original subject has not been sidetracked. At first sight it may appear that the construction and the manipulation of pattern plates has but little connection with molding machines, but I hope that I will succeed in showing in the course of this work that they are not only intimately connected with each other, but that they are in fact the principal parts of all molding machines. The lack of intimate knowledge of how to make use of them to the best advantage, the want of proper means to effect this purpose and the wretchedly little effort which is made to catch the right spirit of their nature is generally the reason why a molding machine becomes an elephant on the hands of a molder and an eyesore to its owner.

Central Pennsylvania Industrial Notes.

HARRISBURG, PA., June 17, 1902.—Little of importance save the settlement of several labor troubles in this part of the State can be reported this week. The announcement in Reading that the Reading Iron Company had advanced puddlers' wages to $4.50 per ton was followed by similar announcements from Lebanon and Columbia, and all of the works recently closed in Lebanon and Lancaster counties on account of trouble with the men have started up. The Susquehanna Iron & Steel Company have granted the increase to about 1000 men, and the other works fully the same number.

The Pennsylvania Supreme Court, sitting in this city, last week rendered an opinion in which the sale of interests of the Coleman and Grubb estates in the Cornwall Ore Banks was upheld and declared legal. The case involved certain new points of law and was necessary to give a clear title. The makers of the wills had forbidden the sale of interests, but the executors, holding that the change in management of iron and steel properties within the last few years had altered conditions, made a sale to the Pennsylvania Steel Company. The Lebanon County Court decided in favor of the legality of the sale, and has been upheld. The Pennsylvania Steel Company will now carry out their plan of increasing their operations in the vicinity of Lebanon. There are many reports about what the company are going to do and newspapers have credited them with desiring to acquire Robesonia and Sheridan furnaces. Nothing can be learned about these matters.

The Dauphin Bridge Works will add a night shift to the force now employed. Similar action is being taken in several Cumberland County works, the Carlisle, Chambersburg and Waynesboro plants being exceptionally busy.

The Susquehanna Iron & Steel Company have put Vesta Furnace into blast after an idleness of 21 months. Both stacks of the company are now in operation.

The Pennsylvania Steel Company have blown out No. 4 Furnace for repairs. The company have started up some of the machinery in their new frog, switch and signal department.

The Harrisburg Foundry & Machine Works are working on orders for Cuba and Asia. The works are very busy.

The Landis Tool Company of Waynesboro have decided to make some changes, which will increase the capacity of the foundry. It has been exceptionally busy of late.

A number of appeals have been made to the Dauphin County Court from the settlement of the Auditor-General of Pennsylvania on State taxes on capital stock and loans, and will be heard this year. Almost all of the big iron and steel, coal and coke companies are interested and thousands of dollars are involved. Last year the suits of a similar character aggregated over $100,000 in verdicts.

Steps are being taken by the people of Sunbury to have the rolling mill and nail works rebuilt at that place. They were burned some days ago, and it is said that the hope of the rolling mill being re-established is well founded.

According to records at the Pennsylvania Steel Company's Steelton Works there were 45,000 tons of finished product shipped from the works during the month of May, and more could have been shipped had cars been available. The output of the steel and rolling departments was large, top notch figures being obtained. The bridge department was also very busy, and some large shipments of material were made to the Eastern cities. June started with all departments in operation and rapid progress being made on the additional buildings, which, it is hoped, will be occupied this summer. New engines and electrical machinery are being installed. S.

The American Society for Testing Materials.

In a quiet, almost unobtrusive manner admirable work in an important direction has been progressing for some years on the part of a body known as the American Section of the International Association for Testing Materials. The fifth annual meeting of that organization was held last week at Atlantic City, N. J.

Its Aims and Objects

were lucidly stated in the address of the retiring chairman, Dr. H. M. Howe, professor of metallurgy of Columbia College, from which we quote as follows:

"The testing of materials has two chief features, first, the manner in which tests shall be conducted, and second, the specifications which the materials tested must endure. Of these two features the European members of the International Association in general regard the former, the manner of conducting tests, as the primary object of the association, and the second, the reception specifications, as a thing for later consideration. But we American members, I take it, look at the matter from a radically different standpoint, and look to the erection of normal or standard reception specifications as by far the more important object. It appears to us that buyer and seller have greater difficulty in agreeing on the specifications which the material bought and sold must fulfill than in agreeing on the methods to be used for deciding whether those specifications, once agreed on, are fulfilled by a given lot of material. We do not expect nor do we think it important that the standard specifications which we erect shall be exactly complied with in many or, indeed, in any actual transactions. But we are firmly convinced that the existence of such standard specifications, stamped as standards of reasonableness by a properly constituted body such as we aim to be, will greatly facilitate agreement between buyer and seller, will help them to come to terms, to convince each other that this or that item specified by one of them and objected to by the other is or is not reasonable. Reasonableness should be the spirit in which every negotiation is carried on; standards of reasonableness such as we wish to erect should greatly aid reasonable men in deciding what is reasonable. While we believe this true of domestic negotiations, we believe that it applies with even greater force to international negotiations between buyer and seller who have never seen each other, who live under different conditions of society, with different traditions, conceptions and points of view.

"No words are needed to show the great importance of this field of work. It is well that there should be some society with this as its chief object. Such a society should have very strong international affiliations; these we have. It should represent both sides of the negotiations, seller and buyer, maker and user. It should represent also what we may term their professional counsel, the consulting and inspecting engineers. If I may still further borrow the terms of litigation, it should represent also the bench, that is to say, the institutions of learning through their teaching and investigating staff, and the engineering press. These three classes, I repeat, first the negotiators themselves, maker and user; second, their counsel, the testing and consulting engineers; third, the disinterested and quasi-judicial class, the teachers, investigators and editors, should be fully represented in our membership and our Executive Committee."

Among those present were:

Henry M. Howe, professor of metallurgy, Columbia University, New York.
Edgar Marburg, professor of civil engineering, University of Pennsylvania, Philadelphia.
Dr. C. B. Dudley, chemist Pennsylvania Railroad, Altoona, Pa.
Robert W. Lesley, Philadelphia.
William R. Webster, consulting engineer, Philadelphia.
H. H. Campbell, general superintendent Pennsylvania Steel Company, Steelton, Pa.
John McLeod, Carnegie Steel Company, Pittsburgh, Pa.
Chas. L. Huston, Lukens Iron & Steel Company, Coatesville, Pa.
R. A. Carter, Monongahela Iron & Steel Company, Pittsburgh, Pa.
James Christie, mechanical engineer A. & P. Roberts, Pencoyd, Pa.
C. C. Schneider, chief engineer American Bridge Company, New York.
P. Kreuzpointner, engineer of tests Pennsylvania Railroad, Altoona, Pa.
Robert Job, chemist Philadelphia & Reading Railroad, Philadelphia.
G. E. Thackray, Cambria Steel Company, Johnstown, Pa.
W. J. Whitehead, National Lead Company, Chicago, Ill.
G. S. Webster, city engineer, Philadelphia.
Tinius Olsen, Philadelphia.
W. K. Hatt, Illinois Central Railroad, Chicago.
P. E. Carhart, Illinois Steel Company, Chicago.
R. L. Humphrey.
Albert Sauveur, editor *Metallographist*, Cambridge, Mass.
Chas. Major, American Bridge Company, Philadelphia, Pa.
W. A. Aiken, Pittsburgh, Pa.
S. S. Voorhees, Washington.
J. W. Bramwell, Philadelphia.
E. F. Kenney, Pennsylvania Railroad, Pittsburgh.
T. C. Condron, consulting engineer, Chicago, Ill.
Asa W. Whitney, Philadelphia.
Dr. Moldenke, secretary American Foundrymen's Association, New York.
Walter Wood, R. D. Wood & Co., Philadelphia.
Oberlin Smith, Ferracute Machine Company, Bridgeton, N. J.

The first session was occupied chiefly in the adoption of the charter of a new society entitled the American Society for Testing Materials and the discussion of the by-laws of that society. The object of this change was to convert it from a section of the International Association of Testing Materials to a quasi-independent though very closely affiliated society, of which every member must necessarily be a member of the International Association for Testing Materials, through members of the latter resident in America need not join the American Society for Testing Materials.

The election resulted in the choice of the following officers:

Chairman, Dr. C. B. Dudley, Altoona, Pa.; vice-chairman, Robert W. Lesley, Philadelphia; secretary-treasurer, Edgar Marburg, Philadelphia; council, James Christie, Pencoyd, Pa.; J. McLeod, Pittsburgh, Pa.; A. L. Colby, South Bethlehem, Pa.; H. M. Howe, New York.

THE FRIDAY MORNING SESSION

opened with the presentation of a report by W. R. Webster, on behalf of Committee No. 1, which dealt more particularly with the specifications for iron and steel. Mr. Webster reviewed the results of the agitation for standard specifications before a number of technical bodies, including the American Engineering and Maintenance of Way Association, the American Society of Civil Engineers, the American Institute of Mining Engineers and the American Society of Mechanical Engineers.

There came up then for discussion modifications in the

Standard Specifications for Steel Rails

which were proposed and adopted by the Maintenance of Way Association at Chicago on March 18, 1902. The principal points of departure from the standard specifications are that a drop test is demanded from every blow of steel instead of from every fifth blow and that a shrinkage clause is introduced.

The question before the meeting was whether these modifications should be adopted by the American Association for Testing Materials. John McLeod of the Carnegie Steel Company urged that no changes be made in the standard specifications which aim to represent American practice. Rail manufacture in the United States is undergoing radical changes, and the proposed modifications might become representative, but until they did it would be unwise to change. He stated that the provision for one drop test for every fifth heat was in itself a compromise between the demands of consumers and the manufacturers, and that the provision

of testing preceding and succeeding heats of a rejected heat guarded against the slipping in of bad steel.

H. H. Campbell, general superintendent of the Pennsylvania Steel Company, objected to the proposed modifications. If the object of the drop test is to check the effect of variations in chemical composition, it is unnecessary, because in modern rapid practice the steel is uniform. If it is the heat treatment which the inspector is after, then testing one bar from each blow does not settle it. The physical structure could be much better ascertained by testing from each heating furnace charge, and then it would be necessary to have a test from each end of each bloom to be absolutely certain, a course which would be out of the question in practice.

Robert Job, chemist of the Philadelphia & Reading Railroad, insisted that one potent cause of failure is not so much a defective structure as the presence of foreign matter in the steel, "foreign matter" including not alone oxides and slag, but also gases; in other words, anything which breaks up the continuity of the steel. Mr. Job was called upon to define more closely what he meant, and the use of the term was sharply objected to by Dr. Howe and others. Mr. Job insisted that the testing of only one heat in five gives altogether too much latitude for the passing of unsafe rails.

Albert Sauveur of Cambridge, Mass., raised the point that the rail selected for the drop test should be the one rolled from the head of the ingot, since that is the one which is most likely to be defective through excessive piping of the steel or an inadequate discard in the mill. He presented a motion asking that a committee be appointed to study the danger and suggest means for its avoidance. He made the point that with higher carbon rail steels the tendency to pipe increases.

P. E. Carhart of the Illinois Steel Company stated that the experience of his company showed that a test of one out of five heats is sufficient to show the character of the steel, and that for a long time the Illinois Steel Company selected for drop test the first rail.

Messrs. Kenny of the Pennsylvania Railroad, Job and Voorhees cited instances of failures of rails which justified strict measures for guarding against them.

John McLeod made the point that to ask for the testing of more than one out of five heats involved the danger of blocking the mill and leading to payments for demurrage on cars. H. H. Campbell pointed out that in a modern mill a heat is rolled in five to six minutes and that there is hardly time to make a test of each heat without greatly increasing the testing facilities. Mr. Thackray urged that unnecessarily frequent testing defeated its own object by interfering with the regularity of working, which promoted uniformity of quality. Dr. Dudley dwelt upon the moral effect upon manufacturers themselves of frequent testing.

On motion it was decided to refer the matter of a change in the frequency of drop tests to Committee No. 1, it being the sense of the meeting that no change in the specifications is desirable.

The meeting then took up the subject of

The Shrinkage Test for Steel Rails.

Mr. McLeod urged that as yet too little was known relative to the effect of modern methods of rolling steel rails at a lower temperature to make it possible to include a shrinkage test in the specifications. Mr. Webster called attention to the fact that the actual amount of shrinkage required in the proposed modification of the specifications was left blank. What is wanted is that the specifications shall contain some recognition of the necessity of watching the finishing temperature. Mr. Campbell desired to know how the finishing temperature is to be determined, and pointed out the difficulties attending any attempt to do so. Mr. Sauveur proposed that the initial temperature of the ingot and the speed of the rolling be regulated. Mr. Webster pointed out that the Pennsylvania has introduced a shrinkage clause, and that the issue is whether the mills shall try to finish cooler or ignore the matter.

On motion it was decided to defer the further discussion until the afternoon.

The meeting then took up the discussion of the question as to the desirability of

A Single Grade of Open Hearth Steel for Bridges,

the first contribution to it being that of A. P. Boller, who quoted recent specifications adopted for the bridges of the Wabash extension into Pittsburgh.

Theodore Cooper, the well known bridge engineer of New York, submitted a statement from which we quote the following:

"Believing that both the interests of the steel manufacturers and of the steel users will be advanced by the adoption of one common standard, I think the time has come to advocate the same. But do not understand me to mean that we have yet got a material with which either the maker or user should or can be satisfied. But we can, perhaps, determine a common objective point or average material for a standard, and the struggle of the immediate future, instead of being devoted to getting miscellaneous varieties of steel to suit individual tastes or vagaries, should be to improve and perfect that one standard. With one average material in view, the steel manufacturer should be able to systemize his output to give far greater uniformity than he has heretofore. The users of steel, under one standard material, should demand an important reduction in the limits of variation from the standard average. Under the present limits demanded by the manufacturers of steel there is a difference of 10,000 pounds between the minimum, which determines the strength of our ships, bridges and other structures, and the maximum, which measures the workability of the material.

"In spite of the manufacturers' limit of 10,000 pounds there has been no difficulty for years in getting this limit reduced to 8000 pounds.

"Is it chimerical, then, to believe that with one class of material in view we can get this reduced to 6000 pounds? If this result can be had, as I believe, why should we bend, form, work and punch steel of 70,000 pounds to get a ship or bridge rated at 60,000 pounds? The difference in workability of 4000 pounds is worth money, and the manufacturer who can give the most uniform material should be favored, even at an advanced price.

"In advocating one standard structural material, I have in view all structures and not simply bridges. There is no just reason why the material for ships, bridges or buildings should be different, and there will be no gain in the character of our material unless we can harmonize the requirements to suit all.

"What is the average material which would meet the views and needs of shipbuilders, manufacturers of structural work, steel makers and engineers, under the expectation of the future material being more uniform than we are now offered? I suppose it will lie somewhere between 60,000 and 66,000 pounds, many perhaps considering one too low and the other too high.

"Personally, I should consider, under the above claims, an average of 65,000 pounds steel, or steel varying between the limits of 62,000 and 68,000 pounds, as the ideal material we should expect, the ductility and other qualities being at least equal to those now required of medium steel."

J. A. Greiner, after a brief historical review, made the following points:

"It has been the general practice for the past six or eight years for bridge engineers to specify two grades, the soft being used as a substitute for wrought iron and medium for eye bars or members which were to have holes reamed or drilled and edges planed, and to be used in structures of such magnitude that the saving in weight justified the more expensive shop work.

"Engineers should keep pace with the times. The so-called soft steels served their time after they had quieted the nerves of the conservatives. That time has passed, and at present there is no material difference in the working qualities of the soft and medium steels as usually furnished and accepted. Either grade can be rolled from the same billet.

"Some engineers have recently advocated the adoption of a soft steel limit between 52,000 and 58,000 pounds and a medium grade between 62,000 and 68,000.

It was desired to have a more decided distinction between the two, as well as to destroy the manufacturers' opportunity by supplying either from the same billet.

"All things considered, an open hearth steel ranging from 55,000 to 65,000 is about as satisfactory as can be obtained for structural purposes. It will meet all of the requirements for soft steel and will be about as strong as is usually accepted for medium. Such a steel can be worked under the same conditions as wrought iron, will be just as safe and unit stresses may be taken 20 per cent. greater. This has been the writer's practice for the past two years and is embodied in the B. & O. Railroad specifications for 1901. A single grade as above outlined will sooner or later become standard. If not recommended by some technical association of high standing, it is quite possible that the manufacturers will realize the advantages of such a single grade, not only to themselves, but to the users as well, and then we will be offered the choice of either accepting the standard product of their mills or paying a fancy price to gratify our own desires. The adoption of a single grade of open hearth steel for structural purposes would not bar out the production of a special grade for use in very large structures where the dead load is a controlling factor in the design. The material for such structures, however, should be rolled in accordance with special specifications and not with general or standard ones.

"Neither would the adoption of a single grade of structural steel affect the present soft steel output for rivets. We are not yet ready to use anything but a very soft steel for rivets, especially when driven by hand. When all riveting is done by power there can be no objection to using the single grade steel, as above outlined, even for rivets."

C. C. Schneider of New York, chief engineer of the American Bridge Company, presented a highly interesting and elaborate paper, in which he embodied a table showing historically how the specifications changed in the principal steel bridges built since 1874. We quote from his argument for a single grade as follows:

Advantages to the Manufacturer.

"We certainly have passed the experimental stage and should be in a position to decide for one grade of steel for ordinary structural work. This will be of advantage to the producer and consumer. The manufacturer of steel will be able to conduct his business in a more systematic and rational manner than he can do at the present time. If he uses the same quality of stock he will be able to use the same mixture and obtain uniform results satisfactory to the specifications. The manufacturer of bridges and structural work will be able to keep the usual sizes of shapes and plates in stock, more particularly those of which there are only a few sizes rolled and which are very hard to obtain on short notice, because the quantities used for each structure are small, such as fillers, stiffening angles, tie plates, lattice bars, connection angles, &c. This would, therefore, facilitate deliveries. The consumer will naturally also be benefited by the greater uniformity of the material which will result from only one grade of steel being manufactured.

What Is the Proper Grade?

"Now, admitting that it is desirable to use one grade of steel only, the question arises, What is the proper grade of steel for structural work? In deciding this question, we should consider the process of manufacture in its present state and the probabilities of the future. At present most of the structural steel is made by the basic process, and appearances indicate that the basic process will also be the process of the future for ordinary structural steel. It would, therefore, seem expedient to adopt a grade best suited to the basic process. For special higher grades of steel the acid process will probably hold its own.

"The most satisfactory material which can be produced by the basic process averages about 58,000 to 60,000 pounds; the writer would therefore recommend an ultimate strength of 60,000 pounds per square inch, varying 5000 pounds either way. This grade of steel, in the writer's opinion, may be used without planing or reaming, up to a thickness of about ⅝ inch, without impairing its strength.

"After having agreed on the proper grade of structural steel, the next question to decide is the quality. The quality is determined by the elongation, the bending test and the appearance of the fracture. As far as the elongation is concerned, we notice in the specifications adopted by the Federal Council of Switzerland and by the Austrian Government that the specified elongation varies with the ultimate strength. The Swiss specifications limit the product of the ultimate strength multiplied by the percentage of elongation in 8 inches to not less than 1,280,000, and call this the coefficient of quality. The writer prepared specifications for railroad bridges in 1886, which were published in 1887 as the specifications of the Pencoyd Iron Works, wherein the quality of steel was specified as follows:

"'Steel having an ultimate strength of 56,000 to 80,000 pounds per square inch, when tested in samples of at least ½ square inch section cut from the finished products, will be accepted for the different parts of structures, provided it shows the following qualities:

"'The elastic limit shall be at least 0.6 of the ultimate strength.

"'The product of the ultimate strength per square inch in pounds, multiplied by the percentage of elongation in 8 inches, shall be at least 1,500,000.'

"This value was found by examining a great number of tests, of which only those were selected which proved, by the elastic limit, the elongation, the bending test and the fracture, the good quality of the steel. A similar coefficient was also incorporated in the Bridge Builders' Specifications, published about the same time.

"As this appears to be a consistent and reasonable method to establish the quality of the material by varying the elongation with the ultimate strength, the writer begs leave to submit this question to this association for consideration and discussion, and also the question whether the measuring of the elastic limit or yield point is of any practical value in establishing the quality of the steel."

Mr. McLeod stated that the manufacturers of structural steel had not started the discussion and were prepared to furnish soft, medium and hard steel. He held, however, that an intermediate grade would cover fully 90 per cent. of all the requirements of bridge structures. He considered Mr. Cooper's limits rather high, since a softer steel would not require special treatment after punching and shearing. It would be of great benefit to manufacturers and better service could be given to consumers. The same steel, used for bridges, need not be used for buildings, which do not call for so high a grade of metal. J. P. Snow was pronounced in favor of a single grade of steel, but did not believe in as high a grade as that advocated by Mr. Cooper. He preferred 57,000 pounds, with 4000 pounds either way, but did not object to 60,000 pounds, with 5000 pounds either way. He made the point that if a single grade is adopted the range may be easily reduced as the mills become accustomed to its manufacture. Then a range of only 6000 pounds may become possible. Mr. Snow objected to medium steel with 68,000 to 70,000 pounds tensile strength on the score of safety, because reaming and planing does not remove all the injuries done to the metal in the bridge shop, such as the effect of the gag in straightening. Mr. Snow developed from the standpoint of the bridge engineer the plea that high steel has no advantages, the ultimate strength of the metal having little to do with the life of the bridge.

T. C. Condron's Proposals.

T. C. Condron of Chicago summarized the results of a report presented by a committee at the third annual convention of the American Railway Engineering and Maintenance of Way Association. A vote was then taken, which did not for a variety of reasons seem final. At a conference of bridge engineers held at Chicago last Tuesday there were present Mr. Parkhurst of the Illinois Central, Mr. Loweth of the Chicago, Milwaukee & St. Paul, Mr. Finley of the Chicago & Northwestern, Mr. Dawley of the Chicago and East Illinois, Mr. Cartlidge of the Chicago, Burlington & Quincy, Mr.

Ziesing of the American Bridge Company, Mr. Allen of the American Bridge Company and Messrs. Modjeski, Schaub, Strobel and Condron, consulting engineers.

The general opinion expressed was that one grade of steel would be more desirable for structural purposes than two, both for the manufacturer and user, but that 55,000 pounds is unnecessarily low for the lower limit. At the Chicago meeting the general opinion was that a single grade of steel, having a range of tensile strength, as shown by the ordinary tests, from 58,000 to 66,000 pounds, or 57,000 to 65,000 pounds as second choice, would come nearest to suiting all interests concerned for railroad work.

Regarding ranges of physical properties in any one melt of steel and the likelihood that steel varies 4000, 6000 or even 8000 pounds above or below what any one test shows, Mr. Condron cited a series of tables of tests of open hearth steel plates of the same gauge and heat. The ultimate strength in one lot showed variations of from 2500 to 8800 pounds, with one wild heat of 12,300 pounds, and the other lot variations from 1300 to 8500 pounds. Mr. Condron states that these are not exceptional results, but are what is constantly observed. If variations of 6000 and 8000 pounds in ultimate strength are found in the same gauge and heat, it must be conceded that as great or greater variations are to be found in different gauges of the same heat. Therefore if only one test or even two tests per heat are required, it is important that such tests fall within narrow limits. If more tests are to be made then it would be rational to expand the limits allowable for such tests.

Mr. Condron suggests a single uniform specification for structural steel for ordinary uses with the following range:

Tensile strength 56,000 to 58,000 pounds, two tests required.
Tensile strength 58,000 to 66,000 pounds, tests accepted.
Tensile strength 66,000 to 68,000 pounds, two tests required.
Tensile strength below 56,000 pounds, rejected.
Tensile strength above 68,000 pounds, rejected.

The other properties to be fixed upon in harmony with this range.

In response to questions Mr. Condron explained that where the test shows 56,000 to 58,000 pounds, or 66,000 to 68,000 pounds, two additional tests must bring 58,000 to 66,000 pounds to permit of acceptance of the material.

In reply to a question from W. R. Webster, Mr. Campbell stated that the difficulties in obtaining uniformity in basic open hearth steel increase with the carbon contents.

On motion it was finally decided to refer the question of the establishment of one grade of steel for structural purposes to Committee No. 1, the sense of the meeting being in the affirmative.

FRIDAY AFTERNOON SESSION.

The meeting again assembled under the presidency of Dr. Dudley to take up the question of the

Finishing Temperature of Rails.

The first contribution was from Professor Albert Sauveur of Cambridge, the well-known metallographist, who reviewed the Kennedy-Morrison process as follows:

"The suddenly renewed interest in the subject of proper finishing temperature for steel rails, just alluded to, led the Carnegie Steel Company to a notable departure at their Edgar Thomson plant, from the ordinary mode of proceeding. This move on their part was given much publicity and has attracted the attention of all rail consumers. Stated briefly, the modification which they have introduced in the rolling of steel rails consists in holding the rails on a cooling table a few minutes before subjecting them to the last pass. It is argued that by so doing the rail is finished at a lower temperature, which is the desideratum aimed at.

"Let us look critically into this new departure in rail rolling. The rail when it reaches the cooling table introduced before the final pass is at a high, or relatively high, temperature and is then allowed to cool until a certain lower temperature is attained. During this undisturbed cooling the metal evidently crystallizes and the rail must necessarily enter the finishing rolls in a crystalline condition, which will be the more pronounced the higher the temperature of the rail when it reached the cooling table, and the slower and more prolonged the subsequent undisturbed cooling. It also seems as if the single pass to which the metal is subjected after this crystallizing period cannot be sufficient to break up the crystallization just created. On theoretical grounds, therefore, if a material gain results from this method of proceeding, I do not see how it can be accounted for. Let us remember that any undisturbed cooling above the critical temperature constitutes a crystallizing period. By partially cooling the rail before the final pass we shorten the crystallizing range after the rail has left the finishing rolls, but we create a crystallizing period just before the final pass, which is exactly equal in length to the diminution of the final undisturbed cooling. We do not, by so doing, decrease the total crystallizing range, which alone governs the size of the final crystals; we merely divide it, causing a part of it to be located immediately before the final pass and the balance immediately after, so that a rail treated by this process has passed through a crystallizing period of exactly the same length.

"The only beneficial effect, therefore, that can be claimed for this process is that it breaks up the crystals produced just before the last pass, resulting in a finer structure rail. If we consider that the reduction produced by the last pass is about 5 per cent. it seems hardly conceivable that so slight an amount of work could be effective in breaking a pre-existing coarse structure.

"Similar criticisms of the value of the Kennedy-Morrison process have been published by S. S. Martin of the Maryland Steel Company, who contends, apparently on good ground, that any undisturbed cooling introduced in the process of rolling, in order to be effective in producing a finer grained rail, must take place at an early period, because then the considerable reduction—*i. e.*, the great amount of work to which the rail is subsequently subjected—will break up the crystals formed during that undisturbed cooling. It has also been argued, and rightly, I think, that those mills which do not reheat their blooms produce finer grained rails, for the simple reason that they finish their rails at a lower temperature.

"To sum up, in order to confer a fine-grained structure upon steel rails, three courses seem to be opened:

"1. To shorten the crystallizing period—*i. e.*, the time during which the rail is allowed to cool undisturbedly above the critical temperature (say about 700 degrees C.). In other words, the rail should be finished sufficiently cooled, and the finishing temerature will, of course, depend in turn upon the temperature of the ingot when rolling begins and upon the speed of the operations. The main objection to starting and carrying the rolling at a relatively low temperature is that it throws more work upon the rolls. The objection to a slow rolling speed and handling of the material is that it decreases the output of the mill. Both objections imply an increase in the cost of the rail.

"2. To cause a part of the crystallizing period to occur previous to the final pass—*i. e.*, to allow the rail to cool undisturbedly at some stage of the operations, and for a short time, before completing the rolling. This cooling in order to be effective should occur at a sufficiently early stage of the rolling in order that the resulting crystallization may be broken up through a sufficient amount of subsequent work and reduction. Such results would be obtained by placing the cooling table at the shears. The objection to this course is that the shaping of this cooler bloom into rails would require greater mechanical effort, and, therefore, increase the cost of production.

"3. To finish the rail at the temperature most desirable for easiness and speed of manipulation in rolling and then to reheat it to a temperature slightly above the critical temperature, a treatment which would result in the breaking up of the pre-existing coarse structure, replacing it by a much finer one. This course would undoubtedly be the most effective of the three, as it would not only impart a fine structure to the rail, but also a uniform structure to all its parts, while a rail not so treated must necessarily be coarser in the central

parts than nearer the cooling surfaces, owing to the higher temperature of the center when the rail leaves the finishing rolls and to its slower subsequent cooling. The cost of such reheating treatment would undoubtedly be very great, and, possibly, prohibitive."

S. S. Martin, in his paper on

Rail Temperatures,

reviewed the three different methods used to determine them, rejecting the pyrometric telescope, and preferring to the Le Chatelier pyrometer the water calorimeter. Mr. Martin holds that mills rolling direct have the advantage over reheating mills because ingots charged hot are more uniformly heated in the equalizing furnace than blooms. Mills built to roll direct are of heavier construction with heavier rolls, which will stand the harder work of colder rolling. With increasing tonnage and faster forcing of the steel through the mill the structure should and can be kept uniform. Mr. Martin cites the case of a mill whose tonnage went up from 900 to 1750 tons per 24 hours, the structure being kept the same. The structure is better in direct rolling because the bloom goes through the whole of the "rail" rolls at a lower temperature, while in a reheating mill where the bloom has had a "wash" heat, is rolled at a high temperature to the final pass, and is then held sufficiently to get the desired shrinkage, a case hardened rail is the result. It has a fine skin and a very granular interior, which certainly is rolled at or under the critical point. If rolled under the critical point a tendency to pull the granules asunder develops, and if rupture is not actually produced strains are set up which will under certain impact produce rupture. This is illustrated by microphotographs of a rail in which the side of the head left the projected web on account of the weak cleavage caused by the big faces of the crystals. It was an 85-pound rail, American Society section, which had been in the track for three months. In rolling it was held before the final pass in order to get the required shrinkage. It seems important that the head of the rail have a nearly homogeneous structure.

Mr. Martin made comparisons between microphotographs of one bar rolled very hot to the final pass and then held until it had 6½ inches shrinkage in 33 feet, and another rail rolled through the mill at a lower temperature but with a 7-inch shrinkage. Since the latter showed a better structure it may be truly said that low shrinkage does not necessarily mean good structure.

A comparison of a number of drop tests of rails rolled direct and reheated, held at the final pass, showed that there was considerably more deflection in the rails held before the final pass. The Pennsylvania Railroad raised their maximum deflection in their specifications last year to 2¾ inches, so that heats might not be rejected which showed such tendencies during the previous year. The direct rolled had 1.5 inch, while the reheated rails held before the final pass had 2¼ inches deflection.

Mr. Martin reaches the conclusion that shrinkage is not an index of structure, and that the only way to determine structure is through microscopic investigation of the work of individual mills.

P. H. Dudley's Views.

Many will infer that colder rolling is the only important requisite now required to make rails which will meet the demands of present service, reducing the loss of metal by wear to as slow a rate as was the case on the early Bessemer steel rails of two decades ago under the lighter wheel loads. This would be a return to the practice which then prevailed with the limited output and a price of rails of three to four times the present cost.

Besides a return to the slower and consequently colder rolling from the small ingots of the early Bessemer steel rails which replaced iron, a sound ingot is needed of a grade of steel which will produce the essential physical properties for the rails as girders, and also insure a slow rate of wear.

It should not be forgotten that while we are all familiar with the rapid doubling and trebling of the wheel loads in the past decade the strains in the rails as girders are principally met by elasticity of length, while the increased intensities of the wheel pressures per unit of contact between the wheel treads and the rail heads are sustained more by the elasticity of volume, which is quickly reduced by the slightest unsoundness of the metal in the surface of the rail head. Therefore, to have the most benefit from colder rolling or heat treatment the metal must be sound and homogeneous.

The evolution of the present "up to date steel mill" has been more in the direction of increasing the output and decreasing the cost of the product than of any intention of decreasing the quality of the finished rails.

The mechanical conditions for an increased output have received most of the consideration. It was not anticipated from a metallurgical standpoint—the latter not being so well understood—that there would be a decided reduction in the quality of the product from the same composition as was used for the earlier sections. These had more work, in fact, by eliminating the essential time element for crystallization in the slower and colder rolling. Now that a large product can be secured the question of quality for present service is being considered more generally.

There does not seem to be any reason why the construction of a rail mill is not possible which will permit not only much colder rolling and finishing temperatures than are now general, without restriction of the output, but turn out a more uniform and better finished section than is now produced. The standards of smoothness of track are now much higher than a decade ago on all of the important trunk lines, and they have not reached their limit. The smoothness of the surface of the rails rather than its wear now determines when they must be replaced.

Both practically and technically it may be said to have been recognized by many people for a long time that for the slowest rate of wear in the heads of rails the metal should be fine grained. Experience has confirmed this, and also the important fact that the metal must be sound and homogeneous.

The work of the blooming passes breaks up the coarse columnar structure, though rarely without several skin cracks occurring, which, though not completely, roll out partially in the roughing and finishing passes for the rails. Some seconds are produced, the percentage being high when exceeding 5 or 6 per cent.

It requires close attention to the composition and manufacture to produce an ingot with a columnar structure that will withstand the subsequent heating and blooming without cracking. Cobbles are not infrequent. If the rolling is direct from the ingot to the finished rail then the work of the passes must break up not only the ingot structure, which seems to be done before or during the dummy pass, but prevent the building up of a coarse structure until the work ceases. This should be near or slightly below the critical temperature for the given composition.

Rolling or forging not only can break up a structure during hot work, but check a large crystallization to the critical temperature for the steel.

Hot work influences the final texture of steel by breaking up the ingot or bloom structure, as the case may be, reducing the steel to a plastic or possibly a porcelanic condition, and by eliminating the essential time element for the crystalline forces to rearrange the combinations retards crystallization from a higher to the critical temperature for the composition. This important principle is the keynote of practice to be observed to improve the quality of steel rails during the period of proper hot work. It can be so well applied in practice as not to restrict the output.

Rolling may be continued some 50 or 60 degrees C. below the critical temperature without sufficient loss of ductility to be of moment.

Blue working is not advisable, though below this temperature the steel again increases in tensile strength, then reducing slightly as it reaches 30 degrees C.

Some of the early foreign Bessemer steel rails were rolled until the critical temperature in the head was passed, while one firm toughened their rails. In regard to ductility I place more restriction upon it than Pro-

fessor Sauveur does in his paper. In rails I insist upon high elastic limits in the metal and then the requisite ductility for safety and good wear of the rail heads.

Rails in the tracks of steam railways to carry the moving wheel loads must perform the functions of continuous girders, and we are limited as to the amount of ductility we may give the metal for rails.

The rails must be elastic, and should have high elastic limits, 55,000 to 60,000 pounds, and then have the requisite ductility and fine grained structure in the metal for wear.

Unit fiber stresses in the base of rails under high speed trains, even in 80-pound rails of 45,000 pounds in tension, are not uncommon.

The introduction of stiffer rails as girders in the tracks and the higher standards of maintenance possible have permitted the doubling of the driving wheel axle loads, the tractive power of the locomotives, the passenger train loads, and increased the freight train load four to six times during the past decade.

The steam pressures have been increased from 135 to 205 pounds, due to the use of steel in locomotive boilers, and the latter increased in capacity, so they can generate and maintain an expenditure of 1200 to 1500 horse-power at 60 and 65 miles per hour. Such service is only possible on the stiffer and heavier rails of the present.

It is a fact now known, but not generally understood, that the stresses in the rails increase decidedly under the large expenditures of tractive power, besides that due to the weight and speed of the locomotive. With the increased service which has followed the introduction of the heavier and stiffer rails there has been a legitimate increased wear of the head, while there has been some increased wear due to the quality of the product. The increased axle and train loads have resulted in a decrease of operating and maintenance expenses, so that from the financial standpoint it is found desirable to use the stiffer and heavier rails. The demand for such rails at the present time (1902) exceeds the output of the mills, and any manipulation of the process of manufacture which will limit the output is not likely to receive much consideration. There is no reason, however, why the output need be limited to insure much colder rolling or the manufacture of a fine grained rail.

Rails rolled direct from the ingot have a finer texture, as would be expected, than those from the same composition rolled from reheated blooms. The shrinkage allowances now prescribed for 80 and 100 pound rails are yet in excess of the allowance for the former lighter rails, and some reduction in the future may be expected.

The General Discussion.

Mr. McLeod explained how the idea of the new heat treatment of rails grew out of a meeting held at Chicago by a number of leading railroad and rail men who studied the question how to bring the heavier modern sections of steel rails up to the quality of the lighter older rails. He stated that before finally deciding to remodel the Edgar Thomson rail mill for the Kennedy-Morrison process extensive experiments were made to determine whether it would be necessary to go back of the last pass—a natural course, since it would involve little additional outlay to arrange for going back further if it were found desirable. It was not done because it was not necessary to do so. This was confirmed by earlier experience with eye bars, in which similar heat treatment was successfully introduced. As for the effect of the process, very encouraging results have been obtained from rails so treated, which were put into the yard tracks at the Edgar Thomson mill, where the service is particularly severe. So far as these experiences have gone they have proved the longer life of the rails treated by the Kennedy-Morrison process. Still, with all the encouraging results engineers should wait before changing the specifications. Mr. McLeod urged that the shrinkage clause, as a measure of heat treatment, should only be adopted provided it were coupled with some time qualification. He suggested also that when the effect of the heat treatment is once established it will be found to invoke changes also in the chemical section of the specifications.

Dr. Dudley of Altoona made the point that rails are withdrawn from the main track when the wear has amounted to a reduction in the hight of ⅜ inch. The surface of the rail then becomes wavy and rough. It would seem, therefore, that the effect of the heat treatment is adequate if it penetrates below ⅜ inch.

In response to questions it was developed that the reduction in the last pass in rail rolling at Edgar Thomson amounts to 7½ to 10 per cent.

Mr. Kenney of the Pennsylvania Railroad explained that the idea of demanding a shrinkage limit and of fixing the amount at 5½ inches on an 85-pound section was the result of protracted experiments at the Cambria mill.

The rail manufacturers present explained at some length that mill conditions, notably the distance of the saws, must affect the amount of shrinkage, which brought out the point from Mr. Webster that thus far the proposed specifications have not inserted in them the amount, and that what is wanted is that the engineers keep a record of the shrinkage.

Mr. Sauveur reiterated his claim that the slight reduction in the final pass can only have a superficial effect, while Mr. Carhart explained that in direct rolling the shrinkage cannot be brought down as low as it is at the Edgar Thomson mill, with the Kennedy-Morrison process.

Dr. Dudley then followed with a talk on

The Relation Between the Basic Open Hearth Process and the Physical Properties of Steel.

He recounted how the Pennsylvania Railroad many years since had steel axles first made by the Midvale Company, and how they had failed in service; that the company had returned to iron until the basic open hearth process developed. Six years ago they had issued specifications for steel passenger axles with carbon ranging between 0.35 and 0.50 per cent., phosphorus not above 0.07 per cent., manganese not above 0.60 per cent., sulphur between 0.03 and 0.05 per cent. and silicon not above 0.10 per cent. Since that time 380,000 axles have been put in service, by far the greatest part of them made of basic open hearth steel. Of these four have broken. For freight axles the specifications have not been as rigid, but a number of wrecks of passenger trains have been traceable to the failure of freight axles on trains on the other track, and it has been decided that the same high quality of steel shall be used in freight car axles as is employed in passenger car axles. Dr. Dudley sought information on the point whether the removal of phosphorus has so modified the character of the steel produced by the basic process that the old ideas of tensile strength as related to carbon contents must not be revised.

H. H. Campbell explained at length his observations, fully detailed in his famous book, as to the effect of the different elements, and referred also to the work along similar lines carried out by Mr. Webster.

This was followed by an interesting paper by Paul Kreuzpointner of Altoona on the "Ethics of Testing," and by Professor Lanza of the Massachusetts Institute of Technology on the "Quality of Steel Used in Rivets and How it Compares with Wrought Iron Rivets."

In the evening there was an "Engineering Smoker," at which a number of papers on cement were presented and discussed.

Saturday morning was entirely given over to papers relating to cast iron and to discussions on them.

The Delaware River Ship & Engine Building Company, with a capital of $5,000,000 stock and $2,500,000 5 per cent. bonds, have been incorporated under New Jersey laws, to take over the Roach Shipyard property at Chester, Pa. It is understood that John B. Roach will be president of the company for a year, and that the active management will be in the hands of D. E. Ford of this city, now marine manager of the Standard Oil Company. He will act in the capacity of general manager and treasurer. Edward L. Levy, formerly connected with the firm of Neafie & Levy, will be secretary and acting vice-president. Osborn Congleton, president of

the American Elevated Railroad Company, will be vice-president. Secretary Levy is quoted as saying that a dry dock 700 feet long with 28 feet of water above the sills is to be constructed.

Solid Rolled Steel Wheels.

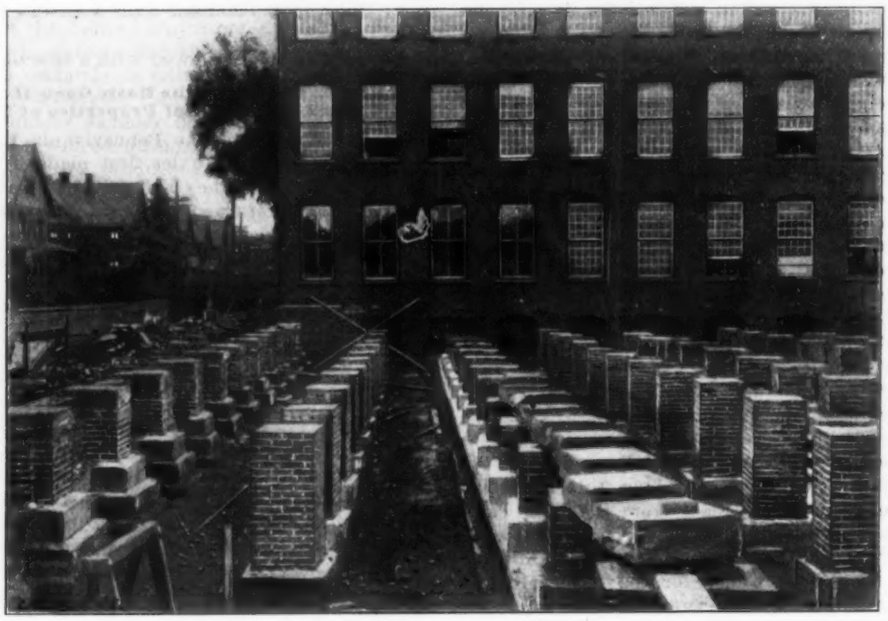
The American Car & Foundry Company, says the *Railway Review*, will exhibit this week at the Saratoga convention of the Master Car Builders a solid steel car wheel of the kind which they are now manufacturing at their Chicago plant under the process and direction of H. W. Fowler. It will be remembered by many of our readers that Mr. Fowler manufactured solid steel car wheels with rolled treads, in Chicago, from 1886 to 1891. These wheels developed serious defects, owing partially to the lack of homogeneity in the steel then procurable and partly, probably, to the fact that the rolls only operated on the tread and flange of the wheel —no rolls being operated under the rim. Spongy or porous spots existed which were not visible. In the course of wear the material above these spots laminated or scaled off, betraying the soft spot underneath. Notwithstanding this fact, some of the wheels proved all right and it seems probable that between 200 and 300 are still in use, having been in constant service principally under passenger cars for from 12 to 15 years. Some of these wheels, on the Chicago, Burlington & Quincy Railroad, for instance, must have made over 800,000 miles.

A cast steel blank was used then as now, but the advance in the art of steel making now assures a much more reliable product. In his new method Mr. Fowler uses rolls over the tread and flange, and rolls underneath the rim as well, so that the steel is worked more as it is in making tires. The rolls underneath the rim are inclined downward somewhat toward the plate of the wheel, and as the angle of pressure is at right angles to the axis of the rolls, the material in the rim is worked by the rolls above and below, with the exception of a slight A-shaped section over the bearing of the plate. That this section is very small and does not reach the wearing limits has been shown by boring into the casting from the side of the rim before rolling; after rolling the hole has been found entirely closed by the pressure, showing only a trace of a line when cut through. The hub and plate are not affected by the rolling, remaining as cast. The cross section of the rim or tire portion is reduced by the rolling 20 per cent., and hence is made very dense. Mr. Fowler claims that these wheels can safely be turned down the same limit as a steel tire. Several hundred wheels have been made and many more have been ordered. The price asked for them is much less than that of any steel tired wheels, and it is believed that with increased facilities for manufacture it can be still further reduced. The difficulty of getting the cast steel blanks has operated to prevent continuous manufacture of the wheels as yet.

A Shop Foundation on Made Ground.

The Pratt & Whitney Company of Hartford are building a large extension to their small tool department. It is located alongside the present building devoted to this work, and measures 80 x 120 feet, four stories in hight. The design is skeleton construction, the frame being of yellow pine timbers and the walls of brick.

The peculiar feature of the structure is the foundation, which rests upon ground which was filled in many years ago. Cellar space was not required, as the present building provides all that is needed. Under these circumstances it would have been extravagant to have sunk piles. In order to secure a firm foundation, free from all danger of settling, the following method was pursued. The excavation was made over the entire plot to a depth of only 4 or 5 feet below the street level. Upon this were built concrete piers, topped with brick, for the walls and columns. Extending across the space are three concrete footings, which are stepped, as shown in the engraving. These extend the entire length of the building, and each forms one single block of concrete 6 feet wide at the bottom by 120 feet long. This distributes the load over an extremely wide area. On these footings are built brick piers which carry the floor beams. As additional supports for the first floor, which will be used as a storeroom for finished tools, there are rows of brick piers on concrete blocks. It will be seen that this method of construction furnishes a very great foundation area as compared with that of the entire building.



A SHOP FOUNDATION ON MADE GROUND.

Stamp Mill Shoes and Dies.—A pamphlet by Arthur Koppel, 66 Broad street, New York, deals with his forged steel shoes and dies for stamp mills. That these are correct in hardness and toughness has been shown in many comparative tests. The forging frees them from all blow holes and other flaws, so that they wear evenly. They are, consequently, longer lived than cast steel shoes and dies.

The Metallurgy of the Cupola.

BY H. E. FIELD, ANSONIA, CONN.

Importance of Cupola Practice.

I have no ideal cupola to bring before you, no improved wrinkle of center blast, steam melting or ozone generator. I shall devote all the time you have so kindly placed at my disposal to a study of the effects of melting upon iron and upon the metalloids therein contained. Numerous contradictory statements concerning this subject which have appeared in recent books and journals, together with several requests for information in regard thereto, have led me to choose this somewhat technical topic for my paper.

The quality of cast iron depends to a great extent upon cupola practice. The best of pig iron can be changed into inferior cast iron by poor melting, while an inferior pig may, by judicious melting and mixing, be used in high grade castings. There are hardly two cupolas in existence which work under exactly the same conditions, with the same sized tuyeres, the same amount of blast, with equal hight of tuyeres from cupola bottoms, &c. For every variation in cupola arrangement there is a variation of the effect in melting iron. The greater the difference in the cupolas the greater will be the variation in the melted product. Pig iron and coke merchants frequently find that two firms engaged in exactly the same line of work and using the same iron and coke get very different results. Let us take as an example an experience which the managers of a certain foundry had with coke. They had used for a number of years a standard brand of Connellsville coke, and their cupola had been so arranged as to give the best results with this coke. The agents for another grade of coke, of a much lighter nature, finally persuaded them to try a car of their coke. After carefully ascertaining that a neighboring foundry was having excellent success with the lighter coke, they bought a carload. The first day it was used the trouble began, and continued to such an extent that no more of that coke would be taken as a gift, and the last of the car was worked up mixed with one-half Lehigh broken coal. Upon inquiry the cause of the differing results obtained by them and by the neighboring foundry, which was using the same light weight coke with such excellent results, was found to be this: In their own cupola the distance from the tuyeres to the sand bottom was but 11 inches, while in the cupola in which the lighter coke was being used so successfully the distance was 20 inches. The tuyere area in the former was but one-half that of the latter, while the pressure in the former was greater by 4 ounces. This needs no explanation to one familiar with cupola practice.

Turning from coke to iron, we find that the percentage of loss or gain of the metalloids or impurities varies with the hight of tuyeres, size of bed, melting ratio, the size of the tuyeres, pressure of blast, amount of flux and the method of fluxing. When pig iron in the course of melting comes in contact with the blast and is acted upon by it, certain of the metalloids are burned out of the iron. This is true in all cupolas. The amount burned out increases with the amount of air forced into the cupola by the blower. In the same cupola, and under the same conditions, irons varying in composition will lose different amounts of impurities. As the melted iron, freed to a certain extent from some of the metalloids, passes through the incandescent bed of coke or coal it absorbs new impurities from the bed. The amount absorbed varies with the cupola practice. From a heavy or deep bed, other conditions being equal, more impurities will be absorbed than from a light or shallow bed. The temperature of the iron at this time has a decided effect upon the amount of metalloids thus taken up by the iron, as does also the amount of flux used. With a hot running cupola and a large amount of flux little sulphur will be absorbed by the iron, while a large amount will come off with the slag.

There has been much discussion in the last year or two as to whether certain of the metalloids lose or gain in passing through a cupola. The great variation in the results obtained by reliable experimenters has led to a general belief that there is no fixed rule which can be followed in figuring these cupola losses and gains. This idea, however, is incorrect, as I shall try to prove by taking up each metalloid separately.

Sulphur.

Under ordinary conditions iron melting in a cupola takes up sulphur from the fuel. The greater the percentage of fuel and the greater the percentage of sulphur in the fuel, the greater will be the amount of sulphur absorbed by the molten iron. The ratio between the total amount of sulphur present in the fuel and the amount absorbed by the iron is dependent upon three conditions—1, the kind and quality of flux used; 2, the temperature of the iron, and, 3, the composition of the coke and iron. A proper quantity of flux in a hot working cupola will take care of a considerable amount of sulphur. The sulphur present in the fuel as a sulphureted hydrocarbon has no appreciable effect in increasing the percentage of sulphur in the melted iron. This accounts for the fact that many foundries melting with coal obtain castings with a lower percentage of sulphur in proportion to the amount of sulphur in the fuel than do foundries melting with coke. The greater the amount of manganese in the iron the less sulphur will the iron absorb, and it is possible in cases of very high manganese iron for that iron to lose sulphur in melting, the sulphur passing off as manganese sulphide with the slag.

Silicon.

In passing through a cupola iron always loses in silicon. The amount of the loss depends upon two conditions—1, upon the amount of oxygen brought in contact with the metal in melting, and, 2, upon the composition of the iron as it goes into the cupola. In giving the amount of silicon lost in passing through a cupola authorities generally mention a fixed amount. This may have been true concerning the grade of iron with which the writers were familiar. But it would be wholly untrue concerning other grades. The greater the amount of blast the more silicon will be burned out. The higher the percentage of silicon the greater will be the percentage of loss in passing through a cupola. (By percentage of loss I mean the ratio of lost silicon to the original amount of silicon in the pig.) An iron running 4 per cent. in silicon will lose up to 20 per cent. of its original amount, while the loss in an iron running two-tenths of 1 per cent. is hardly perceptible. This variation in the loss of silicon is accounted for by the fact that the lower the percentage of silicon in the iron the greater is the affinity of the iron for that silicon, and the more difficult will it be to oxidize it; while, on the other hand, the greater the amount of silicon present in the iron the less will be the affinity and the greater the amount oxidized in melting. The percentage of carbon in the iron has a great deal to do with the loss of silicon in melting. This, however, will be taken up later under the consideration of carbon.

Phosphorus.

A very slight amount of phosphorus is absorbed from fuel by iron in melting. It is practically, however, a constant quantity, the small increase being proportional to the amount of phosphorus in the fuel.

Manganese.

Manganese loses in passing through a cupola. Its action is that of a protector from oxidation, and the amount lost in passing through a cupola depends upon the amount of blast and also upon the percentage of sulphur in the fuel. The greater the amount of air forced into the molten metal the more manganese is lost as an oxide. The greater the percentage of sulphur in the fuel the greater will be the percentage of manganese passing into the slag as a sulphide. Manganese is not united with iron as a compound; it is rather alloyed with it, having practically no affinity for the iron.

Carbon.

I have left this element until the last for several reasons. Principally, however, because its action is understood less than that of the other elements which we

have to consider in connection with melting iron. Carbon is really the life of cast iron. Various articles and papers have been written and much discussion has ensued in regard to the effect of melting upon the carbon in iron. Some say that it gains, others that it loses. If the founder is to be able to control his mixtures by chemical analysis he must settle this question for himself. The articles written upon this subject are wholly misleading. In the early part of 1900 there appeared an article in *Machinery* written by J. E. Johnson, stating that iron lost carbon in remelting. This brought a reply from Thos. J. West in the following number, in which he contended that iron gained carbon in melting. Mr. West presented a record of the remelting of the same iron five times. In every case the iron gained in carbon. In a recent number of the *Foundry* W. J. Keep, in answer to a question, stated as a positive fact that iron lost carbon in passing through a cupola.

These opposing statements from authorities on mixing iron can but discourage any one who is attempting to learn from the writings of others the changes which iron undergoes in melting. A few weeks ago the following was referred to me by a foundry foreman: In order to determine the loss and gain in impurities in melting in his cupola he melted a quantity of No. 2 iron. He had the pig and the resultant casting analyzed and figured the differences. He then remelted some of the scrap from this heat alone. He had this iron analyzed and figured the change in carbon, &c. These two results were sufficiently conformative to allow him to figure that his cupola lost 10 per cent. of the carbon in remelting. Some time afterward, having occasion to make castings which required a very hard grade of iron, he had these castings analyzed and found that, instead of losing 10 per cent. of the carbon, his iron had gained in carbon in passing through the same cupola. It was a case of Mr. West and Mr. Keep illustrated in the same foundry. In the experiment of Mr. West, spoken of above, an iron running below 1 per cent. in silicon was used, and this iron gained in carbon. In Mr. Keep's stove plate work iron running high in silicon is invariably used, and such iron will always lose carbon in melting.

Cause of Gain or Loss in Carbon.

Iron may both gain and lose in carbon in passing through a cupola, and whether the gain or loss predominates depends—1, upon the original composition of the iron, and, 2, upon the conditions or method of melting. An iron while passing down the cupola has a portion of its carbon burned off, the quantity depending upon the amount of blast and the time which the iron consumes in passing through the zone of the cupola where the oxidizing influences are at work. After having a portion of its carbon removed the molten iron comes in contact with the incandescent coke in the bed, and from this it absorbs carbon. The hotter the iron the larger the amount of fuel, and the longer the iron remains in contact with this fuel the more carbon will it absorb. If the amount of fuel is sufficient the iron may absorb more carbon than it loses in passing the tuyeres, and thus the iron will have gained in carbon. If, however, the blast is heavy and the ratio of fuel to iron small, the iron will lose more carbon in passing through the oxidizing zone than it can possibly pick up from the bed, and thus the iron loses in carbon. These two conditions are at work every day in our cupolas. Melting with low blast and high percentage of coke will cause a gain in carbon, while the high blast and low percentage of coke will cause a loss of carbon.

The original composition of the pig iron will have much to do with the loss or gain in carbon. An iron made at the blast furnace with a large percentage of fuel will be high in carbon. This, if melted in a cupola with a small amount of fuel, will lose in carbon; while a pig iron low in carbon, made by a blast furnace using a small allowance of fuel, will, when remelted in a cupola with a relatively large amount of coke, gain in carbon. A low carbon iron, then, will tend to gain in carbon, while a high carbon iron will tend to lose in carbon in melting in a cupola.

There is one more factor which we must consider in discussing this loss or gain of carbon in cupola practice, and that is the effect, or rather the relation, of silicon to carbon in this process. I have said that low carbon iron gained in carbon. Let us now qualify this statement by saying that a low carbon, low silicon iron will gain in carbon. Carbon and silicon, although they are analogous elements in many of their properties, have always been considered to be almost opposite in their action on cast iron. The facts of the case are that their actions are almost identical, although the results are different. Pure iron we know will absorb carbon up to 6.67 per cent., while it will absorb silicon up to 23 per cent. One part of carbon, then, is about three and one-half times as effective on cast iron as is one part of silicon. We find this ratio to exist in our pig and cast iron to a marked degree. For every rise of 0.1 per cent. in carbon in our pig iron made under the same conditions there will be a corresponding decrease of 0.35 per cent. in silicon, and *vice versa*. This applies in the same manner to our cupolas. When we melt a pig of, say, 3 per cent. total carbon and 1 per cent. silicon we would expect under ordinary conditions a gain in carbon. If, however, we melt a pig of 3 per cent. carbon and 4 per cent. silicon we are sure, under the same conditions, to find a loss in carbon. Iron in the melted state may be thought of as a solution in which carbon and silicon each reduces the power of the iron to dissolve the other.

We have found, then, that a small percentage of fuel, high blast, high carbon and high silicon tend to cause iron to lose in carbon, while low blast, large percentage of fuel, low carbon and low silicon tend to cause iron to gain in carbon in melting.

When we consider the great variety of iron in use in foundry practice and the divergency in cupolas, we can readily understand that no hard and fast rule can be laid down for all cases. Every foundryman must find out for himself, in his own cupola and with the brands of iron which he uses, or else he must obtain his knowledge from some one whose experience is similar to his own.

Requirements for Various Kinds of Work.

Are our cupolas so arranged as to produce at the least cost the best iron for our work? Are we, in order to save a few cents, running them with the least fuel possible, and paying out, at the same time, dollars to obtain the superior grades of iron necessary when iron is melted with little fuel? Are we melting with heavy percentages of fuel, and then adding limestone to reduce sulphur and steel to reduce carbon? Are we using high silicon to soften when it is really high carbon that is needed, or high carbon when it may be that high silicon would answer the purpose very much better?

For various kinds of work different grades of iron are required. Stove plate and the like demand fluidity and softness, and to secure these an iron high in silicon, high in phosphorus, and rather low in carbon and manganese is most used. For light machinery an iron high in silicon, medium in carbon and phosphorus, and low in sulphur and manganese is necessary. Medium machinery requires an iron medium in silicon and carbon, low in phosphorus and manganese. In heavy machinery, where weight rather than strength is desired, and where castings must be free from shrinks and segregations, iron low in silicon and phosphorus, high in carbon and manganese is essential, and a somewhat higher percentage of sulphur may be permitted. In castings where a high strength is desired an iron low in silicon, low in carbon, low in phosphorus, low in sulphur and medium in manganese is necessary. Cupolas, then, should be so constructed as to best melt an iron suited for grades of its particular foundry.

The hight of the tuyeres must regulate the manner in which the iron is taken from the cupola. Low tuyeres necessitate that the iron be drawn from the cupola as fast as it is melted, and either be held in a reservoir or taken away in small ladles. High tuyeres allow the iron to be collected in the hearth of the cupola and to be drawn off in large taps, and have the advantage of allowing crane ladles to be shifted while the iron is col-

lecting in the cupola. When low tuyeres are used for filling crane ladles, if any time is apt to be lost in changing the ladles, two spouts should be used, one ladle being placed in position while the other is filling. We have mentioned that for stove plate and like grades of work a high silicon, low carbon, low sulphur and low manganese iron is best suited. We have also mentioned that the amount of carbon and sulphur which an iron will absorb is dependent upon the amount of fuel which it passes through. Hence for stove plate and like work the lower the tuyeres, provided they are consistent with good melting, the better suited will the iron be for the work. This does not interfere with the general practice in stove plate shops of removing the iron in hand ladles and by trolley tracks as fast as it is melted. Light and medium machinery castings require only a medium carbon percentage, and are much more advantageously melted in low tuyere cupolas. The somewhat lower silicon used in this line of work furnishes a higher carbon than is present in stove plate iron, and the small bed gives a low sulphur percentage.

In the heavy machinery, where softness and soundness are required, a large bed has an advantage. Low silicon irons which are cheaper may be used, and the carbon absorbed from the deep bed makes an iron high in carbon, while the resulting high percentage of sulphur is less detrimental in this heavy grade of work. The deep hearth allows the collection of a large amount of iron and thus makes the custom of tapping into crane ladles practicable. In the so-called strong irons, named by some gun iron, by others semisteel, we have a somewhat more complicated problem. These irons must, first of all, be low in carbon and low in sulphur, and it is just such irons as these that absorb most readily carbon and sulphur from the fuel. There are cupolas in operation in many of our foundries from which it is practically impossible to obtain an iron above 28,000 pounds tensile strength, for the reason that the hight of the tuyeres requires so great a depth of fuel in the bed that the iron will absorb an amount of carbon and sulphur so great that it is impossible to get a strong casting. For the melting of this grade of iron low tuyeres are essential, and, of course, the iron must be removed from the cupola as fast as it is melted.

The majority of cupolas in operation to-day have extremely high tuyeres, and we have seen that these are advantageous but for a single grade of work. In advocating the lower tuyeres for cupolas I have always met with the above mentioned objection in regard to changing the ladles in time to prevent the iron getting into the tuyeres. It is to obviate this difficulty that I suggest the double spout on cupolas which are so arranged as to make this possible. The modern tendency in building cupolas is to make the tuyeres as low as possible, in order to show a high fuel ratio, and I venture to predict that they will be built much lower as soon as the double spout arrangement is more universally adopted.

Niagara Falls-Toronto Power Transmission.

At a meeting of the Canadian Niagara Power Company, held in Toronto, Ontario, on Saturday, June 7, W. H. Beatty was elected president; William B. Rankine, vice-president and treasurer, and A. Monro Grier, secretary. The Executive Board consists of W. H. Beatty, William B. Rankine and Wallace Nesbitt. On the same day it was announced that the transmission between Niagara Falls and Toronto is to be effected at a potential of 60,000 volts. Contracts for 12 step-up transformers, to be used in this service, have been awarded to the Canadian General Electric Company, at a cost, it is stated, of about $100,000.

That a voltage of 60,000 has been adopted for this prospective transmission is a matter of much general interest. The transmission between Niagara Falls and Buffalo is now effected at a voltage of about 20,000, the distance being about 25 miles. From Niagara Falls to Toronto, by an all land route, the length of transmission line required will be about 90 miles. For some little time a series of experiments have been conducted at Niagara Falls, looking to the use of a voltage of 60,000 on the Toronto transmission line. An experimental line has been in service, the result being that when the Niagara-Toronto line is in operation it probably will be the first commercial application of 60,000 volts.

The Canadian Niagara Power Company will generate current in the plant now building on the Canadian side at Niagara at a voltage of 11,000 and in units of 10,000 horse-power. The transformers will step up the voltage to 60,000 volts, at which pressure it will be hurled toward Toronto. The last transmission line erected by the Niagara Falls Power Company between Buffalo and Niagara Falls is made of aluminum, and it may be that this metal will be adopted for the cables in the proposed Niagara-Toronto line. At first 10,000 horse-power will be sent to Toronto, which amount will be the product of one of the big generators to be installed in the station. Work on the Canadian Niagara Power Company's tunnel and wheel pit is progressing with rapidity. Over 1000 feet of the tunnel have been driven, and the wheel pit work is going on with fair progress. The company's hope is to have power ready for customers by July, 1903, but this does not signify that Toronto will have to wait until that time for Niagara energy. The relations of the Canadian Niagara Power Company and the Niagara Falls Power Company are such that the latter might furnish power from their new wheel pit and station for the Toronto transmission previous to the completion of the Canadian plant. This second great wheel pit and station are now well along, and within a couple of months, or by August next, the first delivery of power from the station is expected to occur.

Stretching between Niagara Falls and Buffalo there are six copper and three aluminum cables, all of them bare—that is, without insulation. The distance from Niagara Falls to Buffalo is not over 25 miles, and it may be accepted as fact that if it is found necessary to insulate cables on a 25-mile transmission, it will be found equally so between Niagara Falls and Toronto, where the distance is 90 miles. If aluminum cables are used in the Niagara-Toronto transmission, it is evident that they would be of greater diameter than copper cables that would carry the same load, and it is, therefore, quite unlikely that any insulation of the cables will be attempted.

Of the notable power developments in this country, it is believed that none of them is using 60,000 volts for transmission purposes. Experimental lines have been operated at even a higher voltage, but prospects are that Niagara will blaze the way in this application, as it has in numerous other features connected with the electrical advancement during recent years. Should power from the plant of the Niagara Falls Power Company, on the New York State side at Niagara, be transmitted across the border into the Dominion and thence to Toronto by this high voltage, it will be somewhat of an international victory in the application of 60,000 volts to commercial purposes.

Perhaps a better idea of what it is proposed to do at Niagara in this matter of development and transmission of power is best obtained through comparison with the latest data obtainable as to what other notable installations are doing. California has won prominence in the matter of going into the mountains for its power sources and transmitting the electric current to market in cities. The Bay Counties Power Company have several transmission lines. The line to Sacramento is 61 miles long and carries current at 40,000 volts. The line to Nevada City is operated at 24,000 volts, and current is carried to Oakland and other places at 40,000 volts, the distance being 140 miles. The Power Development Company of San Francisco transmit current 14 miles at 11,500 volts. The Mount Whitney Power Company of Tulare County, Cal., transmit current 65 miles at 17,300 volts. On this line a voltage of 34,600 is soon to be used. The Utah Light & Power Company operate a plant at Ogden, Utah, where the pressure is raised to 16,100 volts and transmited 38 miles, to Salt Lake City. The Shawinigan Falls Power Company are now building a transmission line between their station

and the city of Montreal, a distance of about 85 miles, over which it is proposed to transmit power at a voltage between 40,000 and 50,000.

From this it will be seen that prospective Niagara-Toronto transmission will have features that will command attention. In the present station of the Niagara Falls Power Company the power is developed in units of 5000 horse-power, and the fact that the generators of the Canadian Niagara Power Company will generate current in units of 10,000 horse-power will make them notable in every way. When the Toronto-Niagara transmission line is in operation it is likely that several Canadian cities will avail themselves of the presence of the line to use the current, so that every city and town on the route between Niagara Falls and Toronto will receive benefits from the transmission of the current.

Some Methods of Increasing Foundry Production.*

BY DAVID REID, BIDDEFORD, MAINE.

Sometimes a foundry, while equipped with all the modern appliances for turning out work, finds itself unable to live up to its contracts, and the following method was employed in one, which, though not modern in all its equipment, yet competes successfully with those that are in the general light machinery work. Being part of a large plant for the manufacture of light machinery, there came a time when the other departments were compelled to run night and day, with the natural result that the foundry, already taxed to its limit, was unable to keep up the work for the machine shop. Part of the work was therefore given to another foundry in order to help out. This was most unsatisfactory to every one, except the other foundry, and the manager adopted the same system, with modifications, as the machine shop—namely, two crews of molders, machine operators and laborers.

The day crew began work at 5.30 a.m. and worked till 5.30 p.m., with one hour for dinner, receiving 12 hours as compensation, while the night crew started at 5.30 p.m. and did not finish till 12.30 or 1 a.m., getting paid for eight hours. The crews changed about every week, payments being made every two weeks, their average time being ten hours daily. On Saturdays the men started one-half hour earlier, to avoid Sunday work. Previous to this arrangement, the men had been receiving three hours extra as a premium for additional work, while the two cupolas, one small remodeled McKensie and a large one of the same type, were supposed to be at their limit, giving in two heats 27 tons melt daily.

In the writer's opinion, the doubling of this amount of iron melted, which was accomplished and even exceeded at times, is the most creditable part of this method of increasing the production. The small cupola was used in the forenoon, being timed to drop bottom at 11.45, and bringing down a melt of 12 tons. Five hours later a laborer "chipped" it out getting it ready for the melter and his assistant, who after eating their supper had this cupola ready for the blast at 9.30 p.m., when a second heat of 17 tons or over was melted in the one cupola, making a total of 29 to 30 tons every 24 hours from a cupola rated by the builders at 4 tons per hour. The main heat of the day was in the large cupola, which seldom went under 27 tons, this being arranged to get through at 5.30 p.m., there being one section of the shop that worked ten hours straight.

This system of increasing the production was carried on most successfully for a period of seven months, until business became normal again, and at the end of that time the foundry was nearly three months ahead of the machine shop, which is an exceedingly good thing to have during the time for labor agitations of various kinds. As stated before, the cupolas used were of the McKensie type, and the hight from bottom plate to bottom of charging door was only 9 feet. The daily consumption of fire brick used in patching was only eight on an average for the entire period of seven months, when the small cupola was relined to the charging door. The molding sand was taken care of by pouring the front of every floor that was to be used at night, in the first or morning heat, and having laborers take out the castings and wet the sand. When the balance of the work was poured and dumped, that sand was placed one side, leaving the cold sand ready to be used by the night crew. In regard to the cost per pound of producing castings by this method, though not at liberty to give exact figures, I can assure you that it was less than the six months preceding, when the men were receiving premiums.

R. C. Cunningham, in his paper on "Foundry Costs," brings up a point that gives a glimpse at the possibilities for increasing production by the division of labor where it belongs. The steel works and some of the specialty foundries have to a great extent solved this problem, and in the recent conference of the Iron Molders' Union and the Stove Founders' National Defense Association, it was recognized by the molders that the general trend of industrial development is in employing skilled labor, as far as practicable, at skilled work. I am willing to predict that in the future, and how near for you individually depends upon your managers to a great extent, every molder, without reference to the class or character of the work, will do nothing but produce, leaving the pouring, the dumping up of work, the cutting and mixing of the sand, and all other laboring work to unskilled labor.

When you reach the point where the molder starts in the morning to practice the art at which he has served a number of years' apprenticeship, and continues at that work all the time he is being paid for, then and not till then will you have solved the problem of the greatest production at the lowest cost. A number, how large I do not know, of you here to-day run jobbing and general machinery foundries, and I venture to say that certainly 95 per cent. of your molders stop when the blast goes on, whether it gives them six or seven hours of molding time, and as all cannot pour first, the greater part of your crew are waiting their turn and doing nothing. What matters it if you insist on their staying in the foundry till the whistle blows? Do you gain anything by it, except the moral effect it has on the other departments, which, of course, is no small matter?

You might ask how the molders would take to this system, and though they appreciate the efforts in this line in the stove foundries where it is all piece work, yet in machinery work might it not cause trouble? Having a large number of molders working under this division of labor principle, I can say that they are perfectly satisfied and think it the finest scheme yet devised, as they have no pouring or dumping to do, thus eliminating the hardest and hottest part of what formerly constituted their work.

The only objection that comes from any one is in regard to the pouring crew. But obstacles are encountered only to be overcome by the ambitious, and the men who do the pouring may be only laborers under the direction of a molder, trained for that special work as you would train them for the molding machine. Or if you prefer it, they can be culled from your apprentices with the addition of a molder or two as leading hands, while a large majority of your molders keep the cost where it belongs by producing molds. The dumping and cutting over the sand in the machinery shop where this system is in vogue is accomplished by means of a night crew of laborers, 15 in number, who take care of the work of 120 men in 12 hours.

That the pouring requires a certain amount of skill is granted, for on that often depends the quality of the work, yet we have an instance right here in old New England where laborers, trained, of course, pour up the entire amount of work put up by the molders in a foundry handling nearly 2500 different patterns in a week, the weight in the castings varying from 1 ounce to 275 pounds. The immediate result of this method of increasing the production was the saving of one day's wage all around, as the same amount and over, in fact, was produced in five days, where before with the same crew it took six.

* Abstract of paper read at the meeting of the American Foundrymen's Association, Boston, June, 1902.

The Fuel Briquetting Industry in the United States.

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Importance of Utilizing Waste Coal.

Various ideas for the utilization of the millions of tons of fuel which are wasted annually in the anthracite and bituminous coal fields of the United States have been exploited in an experimental way, and after some 20 or 30 years of study and inventive efforts looking to economy along these lines American fuel experts have now arrived at the conclusion that the logical solution of this waste coal problem lies in the briquetting of the enormous waste resulting from coal mining operations in the form of fine coal and coal dusts. American industrial leaders have long displayed a reluctancy in accepting radical innovations in matters of fuel preparation. This was displayed in the early discouragement met with by the European exploiters of the by-product coking idea, which for a long time was looked upon in the United States with disfavor, but which in its various systems is now in very successful operation in the leading coke producing districts of the country, and which promises to shift the coking industry from the coking coal fields to the great iron and steel centers where the valuable by-products can be utilized in the processes of iron and steel making to a greater advantage than when such plants are located at points remote from the point of consumption.

What the by-product coking oven has already done for the American coking industry, since its introduction from the fields of England and Continental Europe, where it underwent its first development and exploitation, the fuel briquetting industry is destined to accomplish in the way of turning to an economic value the millions of tons of waste slack and culm anthracite and bituminous coal which are now not only useless but which are a detriment to modern coal mine operation from accumulation about the mines and tipples. This waste coal question has become such a serious one that in Pennsylvania the State Legislature has appointed a commission to inquire into the matter and to devise, if possible, some means for its solution. The importance of the most economic methods being applied in this State is shown by the rapid depletion of the anthracite coal fields, the only coal fields of this kind of economic value in the United States. Of the 3300 square miles embraced in the anthracite coal fields of Pennsylvania but 484 square miles were originally regarded as workable, and the mining operations conducted in these fields during the past 40 or 50 years have been such as to well arouse an interest in saving them from depletion. Last year an army of 150,437 men were employed in the anthracite coal industry in this State, and the production for the year reached 67,471,667 short tons. The operations in the bituminous coal fields of Pennsylvania have for many years been conducted on a like stupendous scale, the production for 1901 being 82,914,840 short tons. Pennsylvania produced more than one-half of the anthracite and bituminous coal mined in the United States, and its annual production is more than one-sixth of the mineral fuel output of the whole world. With mining operations conducted on such a gigantic scale, it is but logical that Pennsylvania should take the initiative in the matter of economy along these lines, and thus accomplish something toward the security of her future coal production through turning to an industrial economic value the vast waste which now characterizes operations in this industry.

Advance in Modern Mining Practice.

Before proceeding to a consideration of the progress of the briquetting industry as applied to American fuels something relative to the waste coal problem will here be given. Those conversant with American industrial development are not unaware of the vast progress attained in this country in mining operations, this industry having been revolutionized through the introduction of modern electrical and other mechanical coal mining and coal handling machinery, and through the application of strictly scientific engineering practice to the industry. While these modern agents have decreased the waste in mining operations in a number of instances and their future development presents a still further elimination of waste in the form of fine coal and culm, yet it is not possible to eliminate this form of loss through advanced mining practice.

Modern mine engineering practice has determined between unavoidable and avoidable waste in actual mine operations, and has already pretty thoroughly eliminated the former cause of waste, hence it remains for us to consider the waste involved after the coal has reached the surface and while it is being prepared for commercial utilization. In bituminous coal operations the system of selling "run of mine" coal is largely in vogue in the different fields of the United States, save in those fields where such coal is mined largely for gas purposes, but notwithstanding there have accumulated about every mine in the country vast mountains of slack and culm, to-day a useless material. Such accumulations are much greater in the anthracite coal fields, where a strict system of screening is universally maintained.

In the anthracite coal fields of Pennsylvania, despite the strict system of screening which utilizes all the coal which will pass over a 1-16 inch screen, the loss of the actual coal taken from the mines runs from 15 to 18 per cent., or, in other words, nearly one-fifth of the actual production of the anthracite mines goes to the culm pike. Statistics show that since the beginning of the anthracite industry on a commercial basis, which dates back to 1820, there have been, in round numbers, 2,000,000,000 tons of this coal mined, entailing a loss in the form of culm of more than 300,000,000 tons since 1820, or about 10,000,000 tons for the year 1901.

From the system of selling large quantities of run of mine coal in the bituminous fields the waste in this form of mineral fuel has not been so large, proportionately, as in the anthracite industry, being now, through the improved coal handling machinery, kept down to 10 or 12 per cent. of the actual coal mined. In former days, however, the waste was much greater. The loss in this manner resulting from the 224,769,091 short tons of bituminous coal mined in the United States last year amounted to about 25,000,000 tons. Bituminous mining statistics in the United States are available back as far as 1868, and since that time more than 4,000,000,000 tons of this coal has been mined. The loss in form of fine coal and coal dusts could not have been less than 500,000,000 tons.

Some knowledge of these vast wastes involved in coal mining operations displays the necessity of evolving means for the utilization of these values, and for some years this subject has elicited much attention in the United States. While the visible supply of mineral fuel in sight in this country, save anthracite coal, gives no evidence of diminishing, American industrial experts have come to realize that the utilization of this vast waste fuel will accomplish much toward the more economic operation of industrial establishments, an object toward which American inventive genius has long been leading. Economy in fuel, in raw material of all kinds and in all mechanical operations has already made no little progress in this country, and of these the fuel question now seems to be receiving the most attention, its present methods probably involving a greater waste than any other industrial operation.

Methods of Utilizing Waste Coal.

Numerous plans, many of them chimerical, have been put forth for the utilization of the vast accumulations of waste coal. Such experiments as mixing culm with lump coal, manufacturing artificial fuel, mixing the coal and coal dust with petroleum, using a pulverized fuel, have all been tried without success. Finally American fuel operators decided to pattern after Europe and attempt the utilization of this waste coal for the manufacture of fuel briquettes; and while the early attempts at this industry resulted in failure it is now evident that herein lies the logical solution of the waste coal problem.

What has already been accomplished in Continental Europe in the fuel briquetting industry effectually demonstrates the industrial economy of the process, and

within a few years America is certain to make important progress along this line. Involving, as it does, some of the complex problems of chemical science, it is but natural that this new industry should have had its first exploitation in Germany, where the researches of the great universities and technical institutions combine with industry in evolving new methods and exploiting new processes. Germany was also the home of the by-product coking idea, a modern economical operation partaking somewhat of the character of the fuel briquetting industry, inasmuch as it is also an industry tending to eliminte waste and to turn to the uses of industry many of those valuable chemical properties which in the ordinary coking methods were lost.

France and Belgium have kept steady pace with development along the line of fuel economies made in Germany, having developed the by-product coking idea at about the same time the idea was perfected in Germany, and adopted the fuel briquetting industry even before the new industry had been evolved beyond its experimental stage by the Germans. In matters of strictly scientific application these countries keep fully abreast with Germany, and their limited fuel supply necessitates the greatest economy along these lines. England has also made vast progress in the way of fuel economy, claiming the credit for first considering the matter of utilizing waste fuel by the manufacture of compressed briquettes, the idea having been advocated in a work published by Sir Hugh Pratt in 1594.

The Manufacture of Compressed Fuel in Europe.

While numerous experiments looking toward the placing of the briquetting industry upon a commercial basis were made in Germany, France and Belgium between 1820 and 1840, it was not until 1842, when a mechanical plant for the manufacture of compressed fuel was put into operation at Berard, near St. Etienne, France, that these efforts resulted in the practical demonstration of the new idea. A compression machine, differing but little from the earlier mechanical brick presses, had been perfected, and was used at this plant. Before this time efforts had been made to briquette fine coal in much the same way that bricks were made before machinery was introduced into brick making. It was not long after the Berard plant was put into operation that similar plants were installed in Germany and Belgium, and since that time the industry has had a wide development in Continental Europe.

One reason why so little attention has been given to this economic fuel industry in the United States lies in the enormous fuel resources of the country. In Europe, where mines are operated under adverse conditions, shafts having been sunk to a depth of several thousand feet, and very thin coal seams being worked, the strictest attention must be given to such matters. American coal is much cleaner than the average product of the European fields. In preparing the latter coals for briquetting, much more labor is required to eliminate the worthless substances and to insure a good compressed fuel. There have also been some decided evolutions in compression machinery abroad. The first machinery evolved was of the single compression type. Of this class there were numerous presses, the product of French, Belgian and German inventive genius. The single compression press was succeeded by a tangential press, and the ovoid type of briquette succeeded the cubical block. About 1860 the double compression machine was perfected, in which one briquette is formed against the back of another, and this machine had a wide use in Europe, being introduced into England and other countries. The next step forward in briquetting machinery resulted in the invention of the roller press which acts tangentially, there being a number of this class of machines in use abroad. Without entering into the various types of briquetting machines evolved abroad, of which there are several hundred, it may be said that it was the Loiseau type of machine, which belongs to the class just mentioned, that was first introduced into the United States, it being, in fact, the only one of the European compression machines which has ever had a thorough test at fuel briquetting in America. This system was perfected by E. F. Loiseau, a well-known French mechanical expert, and has had quite a wide use in different European countries.

The Paris Exposition of 1889 was the occasion of an extensive exhibit of fuel compression machinery, and that of 1900 displayed what European genius is accomplishing along this line. To-day the industry is carried on in every country of Europe which possesses any commercial mineral fuel deposits, the annual production amounting to nearly 20,000,000 tons. Aside from briquetting fine coal and coal dusts, refuse coke is also compressed and thus turned to an economic value. Coal briquettes are now being sent from Europe to South America, where they sell for as high as $8 per ton, entering into competition with American coal which sells at a much less price.

Numerous large briquetting plants are now in operation in the Halle and Westphalian coal fields of Germany, and in the fields of Saarbrucken. France has a dozen or more plants of various types, and Italy, Austria and other Continental countries are now turning their waste fuels to value through this industry. England has several plants, and the industry gives promise of an extensive development in this country in the near future. In adopting this new industry England displays the same reluctance which she displayed in introducing the by-product coking ideas, and in this conservatism she is imitated by America in both these instances.

Briquetting in America.

As has already been intimated, the first attempts at briquetting in America were made with machinery of the Loiseau type, and under the direction of the inventor of this system of fuel compression. About 1866 the anthracite coal operators of Pennsylvania became interested in the briquetting idea, which was then having a wide exploitation in Europe, and after a thorough investigation of the various systems in use abroad a plant of the Loiseau type was installed at Port Richmond, Philadelphia, and the briquetting of anthracite culm was begun there about 1870. It was not, however, until some time later that the plant was put into successful operation. In fact, the plant was never wholly a success, but as a pioneer experiment in a new industry, so far as concerns the matter of utilizing waste fuels in America, this first attempt at briquetting was not without its beneficial results.

Like all other innovations, whether in the varied field of industrial activity or in other lines of advancement, the briquetting industry in America has undergone many years of incipiency, experiment and nurture coupled with failure and partial success, and it has been only within the last five or six years that the American fuel economists have come to a full knowledge of its true work. Following the installation of the Port Richmond plant, and before it was abandoned, the Delaware & Hudson Canal Company installed a similar plant at Rondout, N. Y., this plant having been put into operation in 1876. In the same year the Anthracite Fuel Company were formed to engage in the briquetting of anthracite culm on a large scale, and this company absorbed the Rondout plant, which they operated until 1880, when the plant was abandoned. The third plant of the Loiseau system in the United States was installed at Mauch Chunk, Pa., but its operation was of short duration.

These early attempts at utilizing waste coal by briquetting demonstrated that the cost of culm, the cost of bonding material, operating expenses of such a plant, and the price at which the product can be sold are the material factors in the industry. Where culm can be obtained at a low figure close to market, and where the cost of large coals is materially increased by the cost of transportation, it was demonstrated that compressed fuel was destined to prove of great commercial value. In these early attempts at briquetting 92 per cent. of culm and 8 per cent. of pitch were combined into bricks of 9 x 4½ x 6 inches, a pressure of 250 pounds to the square inch being obtained by the Loiseau press. The coal was prepared by a system of "jigging," and in a number of instances the fuel proved quite satisfactory. One great objection lay in the amount of smoke caused

by the pitch used as a bonding material. At that time the price of coal fell to a low point, owing to the industrial depression following the panic of 1873, and pitch rose to a high price owing to its utilization for chemical purposes to supplant other materials.

American Inventors at Work.

In spite of the failure of these early attempts they were responsible for opening up a new field to American inventive genius. In 1890 the Anthracite Pressed Fuel Company installed a briquetting plant at Mahanoy City, in the anthracite coal fields of Schuylkill County, Pa., a new style of compression machine, patterned after the "eggette" presses largely in use in Europe, having been patented in the United States. This plant was operated until 1892, when the high price of English pitch, used for bonding, resulted in the suspension of operations. At this plant the same proportion of coal dust and pitch as used in the earlier attempts was employed, and it was demonstrated that fuel briquettes could be manufactured at a cost of $1.80 per ton.

Following these attempts at briquetting, plants of various types were installed at a number of points, but like their predecessors they failed to successfully demonstrate the practicability of the new industry. About 1892 a plant was installed at Gayton, near Richmond, Va., at which semianthracite coal was made into small briquettes or "eggettes." After the plant was in operation for some time its capacity was doubled, but it has gone out of operation. The same may be said of the plant at Huntingdon, Ark., at which "eggettes" were manufactured from slack coal from the mines of the Kansas & Texas Coal Company. Plants of this type are now, however, in operation, in an experimental way at Chicago and at Milwaukee, using fine anthracite, bituminous and brown coals and lignites.

Cause of Early Failures.

One cause of the lack of success in former briquetting operations lies in the use of improper bonding material. Late progress along this line has eliminated pitch for this use, and substituted various forms of vegetable compounds. This reduces the smoke in the product, one great objection to compressed fuel existing heretofore. The experiments with lime for bonding fuel briquettes have demonstrated that this substance adds to the amount of ash, hence its use has been abandoned. Numerous patent vegetable bonding materials have been evolved in the United States, and the progress now being made along this line is certain to result in great benefit to the briquetting industry.

Another matter which contributed to the early failures in the industry was the lack of proper methods in preparing the fine coal and coal dusts. In late briquetting methods these materials are prepared by a strict system of washing, all the dirt and other injurious substances being eliminated, and the percentage of ash and sulphur reduced to a minimum. Great progress in all lines of coal handling has been made during the past few years. Coal washing machinery has undergone wonderful improvements, and to-day the proper preparation of fine coal for briquetting and for other purposes is conducted on radically new principles. Improvements in briquetting presses now make it possible to thus produce a fuel which is at once compact and homogeneous, and which will not crumble in transportation, and at the same time its components of ash and sulphur have been reduced to a minimum. The briquette to-day manufactured is of a convenient size, kindles easily and burns freely, retaining its shape until it has become incandescent and reduced to a white ash.

As has already been stated, the first attempts at briquetting in the United States were confined to the exploitation of the briquetting systems evolved in Continental Europe. Prior to the introduction of these systems in America numerous American mechanical experts made a close study of the various systems in operation abroad, and while these systems were undergoing experimental operation in the United States American inventive genius was at work perfecting machinery which would more fully meet the requirements of the various American fuels, and as a result many types of briquetting presses and outfits have been perfected in this country, while other types are now undergoing their development.

One reason for the lack of interest along this line until recently lies in the enormous mineral fuel resources of the country, which has caused the matter of the utilization of waste fuel to be neglected. However, during the past decade American industrial workers have been gradually coming to the ideas which have long prevailed in Europe, and to-day they are making an effort to turn to value many of those materials which not so long ago were wholly wasted, and aside from the value of the wasted materials they, in many instances, greatly interfered with the economic operation of the industries along their lines. While there has as yet been no noticeable decrease in the supply of mineral fuels in the United States American manufacturers are now giving more care to the future, and with this object in view are endeavoring to utilize every possible waste material. Had this been done in Europe a century or more ago the present limited supply of mineral fuels might not exist, and in America the speedy general introduction of this new industry is certain to extend the life of the coal fields many years.

Activity in Developing Briquetting Machinery.

The progress of fuel briquetting in the United States during the past few years is pretty thoroughly reflected in the progress made by fuel compression machinery during that time. There have been fully 100 patents issued by the United States Patent Office bearing on the subject of utilizing waste fuels, including compression machinery, bonding formulas and other improvements incident to the new industry. In many instances, however, these patents have proven useless, while in other cases they have been suceeded by improved types, the result of later labor on the part of their inventors.

One of the earliest successful fuel briquetting presses, and one which is at the same time adapted to briquetting other minerals, was evolved under the name of the Belgian mineral press. This machine consists of two pairs of rollers, whose faces are cupped and impinge, being so set that the cups on one face exactly meet or cover the cups on the opposing face. A spur gear is set between the two cupped rollers on each shaft, meshing into the gear opposite. On the pulley shaft is a pinion which drives a large gear on the countershaft, which, in turn, carries a pinion meshing into the spur gear of one set of the cupped rollers. The whole is mounted upon a structural steel frame, provision being made for feeding through a gate in the housing directly over the impinging faces of the rollers. The finished "eggettes" are received upon a belt or incline and automatically conveyed from the press. This type of press is now in operation in Chicago for fuel briquetting, and has been installed at a number of smelters in the West for the purpose of briquetting the fine precious mineral ores and flue dusts.

The White Presses.

The improved White mineral press represents the most advanced efforts made in evolving disk briquetting machinery. This press consists of two heavy rollers which follow each other around in a circular track or pan bottom, this track being cut out at one side to admit a perforated circular disk, whose center is outside the rim or curb of the mill, and whose top surface is level with the pan track, a segment of the disk thus forming a part of the track over which the rollers travel. The mold disk in the standard machine is 5 feet in diameter by 2½ inches thick, and has two circles of holes or molds near its outer edge and in the track of the rollers. Each mold is 4 inches in diameter at the top and slightly smaller at the bottom, there being 24 molds in each circle.

Each roller is driven by a steel shaft, crank shaped, which permits free vertical action of the roller while preventing lateral motion, which maintains the roller in a vertical position. The movement of the disk is effected by a feed arm, which is provided with a round steel pawl, which drops into one of the holes. As the arm is pulled forward by the action of the crank gear

the pawl swings the disk around 15 degrees, and as the crank gear reaches its first position the pawl drops into the next hole. A repress system is used in this machine, it being equipped with ejecting plungers which eject the finished briquette from the mold onto the delivery belt.

In this system no wet pan or Chilean mill, the latter largely employed in briquetting for mixing, is required, the Gardner Corning fuel bonding patents being used in connection with the press and outfit. The coal is reduced to a pulp by being passed through powerful rollers before the bonding material is added. The material is then subjected to a heat of from 180 to 200 degrees F., and in this manner the material to be briquetted is prepared without undergoing a change in its chemical composition. It is then conducted by means of an automatic elevator to a floor above the press, where the bonding material is incorporated while the mass is still warm. In the press the material is subjected to a pressure of more than 5 tons to the square inch. This type of briquetting machine is now in use at the plant of the Briquette Coal Company, and by the San Francisco & San Joaquin Coal Company, at Stockton, Cal., the latter plant briquetting the lignite coal found in San Joaquin County, Cal. It has a daily capacity of about 500 tons. A number of other industrial concerns are now installing plants of this type.

Opposed to the disk system of briquetting is the plunger type of machine, the leading style of which press is the White briquetting press, which is now made in three sizes, the largest of which has a capacity of 100 tons daily. Through a series of interchangeable pockets and plungers different sized and shaped briquettes can be manufactured on the machine. A rotating crank and pitman move the compression plungers back and forward with a movement like that of a piston rod in an engine. The press box has an independent motion, as it is operated by the cam track in the gear through the cam arm, rocker arm and links. The press box remains stationary at its rearward position, while the compression plungers pass across its interior space, pushing the material ahead of them and forcing it into the molds. The briquettes are ejected automatically. The compressed fuel blocks manufactured by this system are cylindrical in shape, being about 3 inches in diameter and from 6 to 8 inches long. For a year or so an experimental plant of this system has been in operation at Pittsburgh, Pa. The system is already in use by a dozen or more smelting concerns for briquetting fine mineral ores and flue dusts and concentrates, and a number of coal operators are about to install the system for fuel briquetting. At the Pittsburgh plant anthracite, bituminous, brown coals and lignites from every coal field of the United States and Canada have been briquetted, and the experiments here conducted have resulted most beneficially to the new industry.

In the earlier attempts at briquetting cubical blocks much the shape of ordinary brick were manufactured. Work along this line was carried on for some years by the Allegheny Company of Washington, D. C., the work being in charge of a German expert. Several years ago a large quantity of these cubical briquettes stored away in a building ignited by spontaneous combustion and were destroyed. It was then found necessary to mold the briquettes with grooves in their sides and ends in order to give a passage for air in storing, and later the cylindrical and ovoid shapes came to be generally adopted.

The evolution of the briquetting machinery just described gave a new impetus to the briquetting industry as an aid to solving the waste mineral fuel problem. At the same time improvements in bonding material were being evolved. The wet process of preparing the material to be briquetted has also largely been abandoned, and after numerous experiments with tar, pitch, lime, chalk and many similar mineral substances for bonding it was found that all of these substances had their disadvantages, and for a time experiment was turned to vegetable substances such as starch, farina, dextrine and similar substances, and to-day these substances are in general use in fuel briquetting, while lime and similar substances are used for briquetting mineral ores in which the chemical properties are not so important as in fuel briquettes.

It is quite evident that the chemical analyses of fuel briquettes will show a difference in accordance with the bonding material used, the character of the coal briquetted, and in case the mass is subjected to a great heat its character will also be affected, but this is not done in most modern fuel briquetting. Just as some kinds of anthracite and bituminous coal are superior to others so too will some briquettes exceed in calorific power and the other desirable properties of a commercial fuel other fuel briquettes.

Satisfactory Tests of Briquetted Fuel.

In England and Continental Europe fuel coal briquettes have been long subjected to all the uses to which a fuel can be applied, and coke, oil and other forms of compressed fuel are in extensive use. During the past four or five years there have been numerous experiments in the way of actual fuel tests of this compressed fuel, with varying results, but which in the main are quite encouraging to the future of the industry. In the first use of anthracite briquettes for steam generation in the United States it was found that the small particles of coal dust arising in consequence of the forced draft in some instances cut out the ends of the boiler tubes. However, this early difficulty has been remedied.

Tests of briquettes manufactured at different places in the United States, and from various coals, have long been conducted on different railroads in the West with very satisfactory results. It is quite possible to carry a much greater heating power in a much smaller space in the form of compressed fuel than of ordinary coal, one great advantage for railway purposes. The same advantage commends this new form of fuel for naval purposes, and the United States Government has made extensive tests with the new fuel, a number of favorable reports on it having been issued by prominent naval engineers. Tests in many of the uses to which industrial fuels are applied have also been made of the different fuel briquettes now manufactured in the United States, and it is now assured that the industry is destined to have a wide exploitation during the next few years.

The Growth of the Dominion.

George A. Drummond, vice-president of the Bank of Montreal, delivered an address to the stockholders' meeting when he occupied the chair. He referred in the following terms to the condition of the Dominion:

In commercial matters generally nothing is so striking as the growth of the foreign commerce of the Dominion. In the first nine months of the current fiscal year—that is, to March 31—the aggregate foreign trade has reached $302,500,000, as compared with $282,300,000 in the corresponding period of the preceding year, while only five years ago our foreign commerce for the entire period of twelve months barely reached $249,000,000, a figure which, in the fiscal year ending this month, will probably be exceeded by more than 50 per cent. This expansion covers both exports and imports.

The most gratifying feature of the trade returns is the increased sales abroad of Canadian products, which from July 1 to April 1 amounted in value to $144,547,000, and for the full period of 12 months will probably exceed $190,000,000; whereas six years ago the value of our shipments was only $110,000,000.

Products of the soil still constitute much the largest portion of this trade, but it is satisfactory to note that in manufactures the increase is about 30 per cent., or as $12,000,000 to $9,800,000; and I need scarcely refer to the enormous activity in the production of iron, steel, nickel, &c., to say nothing of the extraction of the precious metals, which for the present is under a cloud.

Meanwhile the carrying trade of the country has been in an unprecedented state of activity and prosperity; the great railways are spending liberally on track improvements and rolling stock to meet the demands on them, and new trunk lines are under construction.

Immigration is increasing rapidly and will have a favorable influence in every direction. Lands, especially in the Northwest, which have for years been in little demand, have latterly been actively sought for and taken up.

Notes from Great Britain.

Industrial Prospects After the War.

LONDON, June 7, 1902.—It is as yet too early accurately to gauge the precise effects of the peace settlement in South Africa. That there cannot fail to be an immediate boom in many heavy lines is, of course, obvious, but whether this boom will be entirely transitory in its nature, I question if any business man can foretell. Certainly a large extension of railways throughout South Africa must be undertaken immediately, and it is stated upon authority that at the present time specifications for no less than 47 new bridges are in the hands of Midland bridge builders. Not only must there be an extension of railways, but also more complete co-ordination. This will doubtless take time. To begin with, it is doubtful whether the military authorities would care to plan out a system of railways and superintend their construction with the knowledge that before long they must pass under civil administration. That in its turn leads to the pregnant question whether the Boer leaders are for political peace. If the country in the near future will be cast into a state of political turmoil, the industrial development of South Africa must necessarily be indefinitely postponed.

Again, the articles of capitulation preclude taxation of the Transvaal and Orange River Colony for payment of war costs. This means that the gold industry must in the long run be charged heavily. But this is not immediately feasible, because only a small proportion of the mines are in going order, and large numbers of refugees are practically without financial resources. Even those who have capital to fall back upon have been financially hard hit. The British Chancellor of the Exchequer has expressed his opinion that the Transvaal should pay £30,000,000 toward the cost of the war. This statement being official binds the Government, so that with a heavy war charge upon the gold industry, with enormous costs in resettling the country and reorganizing its administrative affairs, with enormous expenditure in lending money to resettle the Boer farms, with the payment of £3,000,000 as a sort of indemnity for the destruction of farmsteads, coupled with the fact that money loaned does not bear interest for two years, it would not appear that the prospects in South Africa are particularly rosy. If the Boers choose to adopt an attitude of political sullenness and pay their taxes only under *force majeure*, it might well be that South Africa may become a second Ireland, discontented, disorganized, poverty stricken save in one or two special industries.

From the British point of view, the cessation of hostilities, while not leading to any immediate curtailment of expenditure, at least indicates that such curtailment will take place somewhere in the near future. This naturally causes a better feeling of confidence, and will doubtless react upon the market conditions all over the world. With the exception, perhaps, of some variations in the price of money, it is doubtful if the prices of British exported commodities will materially alter. I happened to be in Middlesbrough when the peace terms were announced, and as a matter of fact the price of pig iron declined a few pence. Cleveland warrants during the week fluctuated between 49 shillings 9½ pence and 49 shillings 4 pence, the closing figure yesterday (Friday, June 6) being 49 shillings 2½ pence. Scotch warrants remained steady at 54 shillings 3 pence, and in hematite there was little done, the nominal quotation being 60 shillings. On the whole, the bulls were badly bitten, and the bears came out best. One point is worth noting in connection with the near market prospects, and that is that with one exception the present cotton crop is the best for 20 years. This may possibly enable Lancashire manufacturers to meet low offers of consumers, and by that means render easier trade conditions. I will return to the question of South African economics when more reliable information is obtainable.

The German Customs Bill.

The struggle as between the various trades continues, each trying to get the best terms possible from the Government in the new Customs bill. Thus the Association of German Iron and Steel Industriels has petitioned the Government to incorporate the following tariff rates:

	Duty under new Customs bill	Duty petitioned for by the association.
Welding steel in blocks	1.50 marks per 2 cwt.	4 marks per 2 cwt. when the value is 25 marks and upward for 100 kg.
Tool steel, wrought, rolled or drawn	1.50 marks per 2 cwt.	8 marks per 2 cwt. when the value is 50 marks and upward for 100 kg.

Obviously the taxation of tool steel must influence in the future the competitive cost of German machines.

America and the Iron Trade.

It will be remembered that last year Ernest Parkes, M.P., with others, visited America on behalf of the British Iron Trade Association. The report of this commission is shortly to be issued. Ernest Parkes, however, has not hesitated to express opinions upon the iron trade situation before the book is issued. He has recently been addressing the association on the present and future prospects of trade. He quoted figures showing that the production of iron and steel in America was proceeding at an alarming rate, pig iron alone having more than doubled in seven years, and there was every prospect that by the end of this year it would have more than trebled. During the last three years there had been an increase of 50 per cent. in the iron ore raised. Notwithstanding this enormous output it was not equal to the consumption in America, and they had to send over here to meet their demand. This immense prosperity in America must have a recoil. He prophesied that there would be a very trying time to the over capitalized trusts. Some of these trusts were not in a very sound condition, and when they had overtaken the American consumption they would have to compete with the outside world and with their own private undertakings, which were working more economically than the over capitalized trusts. This American competition would not be a fair one, for they would be able by reason of their protective tariff to get pretty large profits in their own country, to deluge outside markets with their surplus stock, some at cost price and some at less than cost price. That was not a cheerful prospect for the iron trade of this country. They had already felt severely in Staffordshire the German and Belgian competition during the past 12 months, but they would feel competition still more when the American home trade got bad. The Americans had openly boasted that they would invade our markets all over the world, that the English speaking race the world over were their best customers, and that if we failed to keep them they would have them. The Americans were quietly laying their plans for the future, and by controlling the means of transport by rail and sea they were determined to make a great bid for the trade of the world. We must get ready for the great industrial war by improving and economizing our means of production, cheapening our cost of transport by rail and canal, maintaining our shipping supremacy and opening new markets. He hoped the Government would listen sympathetically to any proposition that might be made by the colonial premiers in the interests of imperial trade generally.

Steamship Subsidies and British Trade.

The secretary of the Select Committee upon Steamship Subsidies has sent a communication to the Sheffield Chamber of Commerce asking whether they would like to tender evidence before the committee; also whether orders from colonial possessions or elsewhere have been diverted to other European manufacturers in preference to British manufacturers in consequence of greater convenience or regularity of shipment or cheaper rates for freights from the Continent caused by subsidies; also the effect of shipping rings on British trade;

and, lastly, the advantage or disadvantage of reserving the coastwise trade of the British Empire to British ships. The Sheffield Chamber have replied that there is no doubt that trade is diverted by subsidized lines of shipping from the Continent; that the shipping rings in so far as they impose higher rates on British goods have the same effect, but that the establishment of a coastwise trade of the British Empire for British ships would not be in the best interests of British trade.

Shipping Bounties.

By way of showing the difficulties which the British Government will have to face if it adopted a policy of shipping bounties, I should like to quote some remarks made by Major Jones, formerly the American Consul at Cardiff, who later was naturalized and became a member of Parliament, and who is now editor of the *Shipping World*. He makes some interesting calculations on the French basis, showing what would be the cost of a navigation and shipbuilding bounty. He says:

We have a gross tonnage, taking the figures of 1900-1901, of 14,261,254 tons, against 1,350,562 tons for the French merchant navy. Our neighbors have been paying a navigation bounty of £488,000 a year. If we multiply that sum by the amount of our tonnage we get a total of £5,153,000. We are further entitled to add, say, 20 per cent. for the higher speed of our ships, which would give us £1,030,600, or a total navigation bounty of £6,183,600. Taking next the premium upon building, we find that for 114,971 tons built in her own yards in the year named France paid £232,000. The British tonnage built in home yards during the same period measured 1,103,622 tons, which would be entitled, on the French basis, to a bounty of £2,227,000. To this we are entitled to add 33 per cent. on the score of "speed ton" factor. This addition to the bounty on British ships comes to £742,333, making a total bounty upon shipbuilding of £2,969,332. If to this we add the sailing bounty of £6,183,600, we reach the aggregate of £9,152,933. To this total we may add the expenditure on account of the mail service, the Admiralty subvention, the Jamaica trading bounty, and the sum paid on account of Canada and the West Indies, amounting together to £1,003,412, and we reach a total expenditure of £10,156,334. Moreover, if the calculations were made upon the basis of the new French law the total would be substantially more than that shown in our figures.

The Metal Markets.

The absence of any disturbing influence, such as an alteration of wages, is in favor of manufacturers just now, and there is really very little change observable, either in prices or output. As I have already said, there was no boom on the strength of the peaceful ending of the South African war. Among general orders coming from South Africa I may mention axles and springs for bullock wagons and Cape carts and various kinds of railway material. Manufacturers, however, are pretty well sold and inquiries for future supplies are being met with some fairness. In the finished iron section the only actual advance is one of 2 shillings 6 pence on gas strip, which brings the figure up to £7. Among the reasons for this is an increase of orders from tube makers. Although the coronation festivities are very close, belated orders for tubes appear to be coming in and there is some pressure for strip just at present. In some instances consumers show less reluctance to buy bars, and where this is so prices are tending firmer, but as yet the improvement is not general. Black sheet makers are receiving more inquiries and all round quotations are ½ crown firmer. It is reported that large quantities of steel plating bars from Germany have been imported into South Wales, and yet the bar and billet makers in that quarter have again returned to 5 guineas as their quotation for Bessemer qualities, and even at this figure they report better business. Standard quotations are as under:

Pig iron: Forge qualities, Staffordshire cinder, 48 shillings 9 pence; part mine, 53 to 55 shillings; all mine, 57 shillings 6 pence to 62 shillings 6 pence; best ditto, 77 shillings 6 pence to 80 shillings; cold blast, 95 to 100 shillings; Northamptonshire, 51 shillings to 52 shillings 6 pence; Derbyshire, 52 to 53 shillings; Lincolnshire, 53 shillings 7 pence; North Staffordshire, 53 to 54 shillings. Finished iron: Marked bars, £8 10s.; Earl of Dudley's brand, £9 2s. 6d.; second grade, £7 10s.; common unmarked bars, £6 7s. 6d. to £6 10s.; North Staffordshire bars, £6 10s. to £6 15s.; angles, £7 5s. to £7 10s.; sheets, singles, £7 15s. to £8; doubles, £7 17s. 6d. to £8 2s. 6d.; trebles, £8 10s. to £8 15s.; galvanized corrugated sheets, f.o.b. Liverpool, £11 10s. to £11 15s.; hoop iron, £7 5s. to £7 10s.; nail rod and rivet iron, £7 5s. to £7 10s.; gas strip, £7. Steel: Bessemer billets, £5 to £5 5s.; best Siemens billets, £5 5s. to £5 10s.; mild steel bars, £6 10s. to £7; steel plates, £6 10s. to £7 10s.; steel girders, £6 to £6 5s.; steel angles, £5 15s. to £6 5s.

S. G. H.

Shipping and Shipbuilding in Scotland.

The Shipping Combines.

GLASGOW, May 29, 1902.—The numerous sensational rumors flying around about further possible, probable, impossible or improbable shipping combines are regarded here with equanimity. They make good material for the industrious paragraphists of the morning and evening newspapers, but are otherwise not worth much. Why such a craving for the wholesale purchase of second-hand steamers should exist just now is surprising, considering the fact that vessels can be built here at fully 30 per cent. less cost than, say, at the beginning of last year, and with all the advantage of the "latest improvements" developed in the interim. But since Mr. Morgan bought up the Leyland Line and Mr. Etterman of the Leyland Line bought up other fleets right and left, it has become a sort of pastime to buy ocean steamships by the dozen or by the score. It is not a paying business, and I would not care to have any of the "bargains" which have been so much advertised of late. However the Morgan combine may come out of the deal, the prevailing opinion in this great shipbuilding and shipping center is that the White Star and Dominion lines have come out on top, and very considerably better than the German companies, about whose superior skill in driving a bargain and immaculate patriotism so much has been said—in Germany. It is true that the Germans are guaranteed a dividend for a term of years. But the dividend is only on a portion of their large capital; they remain owners of their costly boats, which are unsuitable for any other trade, and are annually deteriorating in value, and they cannot increase their service between Great Britain and America except by consent of and in co-operation with the Anglo-American companies. On the other hand, the White Star and Dominion companies get rid of their boats at enormously high prices, are to be paid in cash and realizable securities, and retain an interest in a pool to which the German companies will contribute their earnings even when they exceed the amount of the dividend guaranteed to them by the combine. As to the patriotism, do the bosses of the combine care a red cent what flag any steamer in the combine flies so long as she brings profit into the pool, or renders it effective service? The White Star people have been foolishly reproached here for selling their steamers, as if they had not as much right to sell their boats to the highest bidder as the former proprietor of Skibo Castle had to sell it to Andrew Carnegie. There is little doubt the German company would have gladly sold out, too, on the same terms had their connection with the Kaiser and their obligation to the Imperial Government permitted them to do so.

If Mr. Morgan, or any rival aspirant to wholesale dealing in second-hand ships, is ready to go on, there are a few scores of owners in this country quite open to treat. Our ports are filled with laid up vessels, and a large number are afloat which would be much better laid up, for all they are making, or losing. But do not let it be supposed that the acquisition of vessels at present engaged in the Atlantic trade will give the monopoly, or even the control, of the trade to the owners. In 12 months we could duplicate every item on the line, and outrun the lot in luxury and speed, if need be. If, however, you look back over the history of the transatlantic trade since the Cunard Company were founded 62 years ago, you will find that more enterprises have sunk than have flourished in it.

The latest sensation is the reported sale of the fleet of the China Mutual Steam Navigation Company, but who the purchaser is is by no means clear. There are

three separate reputed claimants to the honor, but at the moment the contest lies between Alfred Holt of Lamport & Holt of Liverpool and Andrew Weir & Co. of Glasgow. Mr. Holt claims to have bought the steamers at book value, but the contract requires confirmation, and in the meantime the Glasgow firm have gone one better by offering a premium of 6 shillings per share. Lamport & Holt of Liverpool are the managing owners of a large line of steamers trading with South America, India and China. Andrew Weir & Co. own the Bank Line of steamers and sailing vessels engaged in various trades. The China Mutual Company run regular steamers from Glasgow and Liverpool to Shanghai, Hong Kong, &c. They are all comparatively new and handsome boats, all or nearly all built on the Clyde, running from 4000 to 6500 tons each, and of 14 to 15 knots speed. There are ten of them in all, with a total tonnage of about 50,000 tons, and probably the whole fleet could now be rebuilt at less than the book value. But they are good boats and have a good name.

The Outlook for New Ship Work.

Shipbuilders are hoping that all the numerous deals spoken of mean, at any rate, a revival of interest in shipping which will produce a renewal of orders for ships. Clyde builders, although they have plenty of tonnage on hand, are running through their order books, and would be glad to have some more contracts booked for forward work. Otherwise, the outlook for next winter will be very bad. Costs are now so much down that any little improvement in the freight market should draw out the specifications of owners, most of whom are believed to be only biding their time. The conclusion of peace in South Africa will, no doubt, set free a considerable number of vessels, but for a year or more there will be large employment in carrying troops home and in taking out the troops and stores for the army of occupation, apart from the demand for transport expected to ensue from the industrial expansion of the country. It is doubtful if peace will have any immediate effect on freights and shipping. Those British owners who have been selling at good prices their second-hand ships to foreigners—and there have been further numerous sales of late to the Continent—will replace with new ships as soon as the outlook clears. Meanwhile a few orders have been booked for liners, including both sailing and steam tank vessels for the Anglo-American Oil Company, whose fleet is constantly growing.

This week the Ayrshire Foundry Company have received orders for the heavy castings for three of the big armored cruisers which are being built on the Clyde. Hawthorn & Co., Leith, have contracted with the Government, for two powerful service vessels in connection with the submarine defenses at Portsmouth and Fort Victoria. The tenders for the heavy armor for the new battle ships and armored cruisers are now being considered by the Admiralty, and it is a foregone conclusion that some portion of the contracts will come to William Beardmore & Co., Glasgow, and to John Brown & Co., Clydebank (whose armor plate works are at Sheffield). A good deal of other steel and miscellaneous work in connection with the war ship contracts will also be placed with manufacturers in Scotland.

Test of Pneumatic Tools.

The Chicago Pneumatic Tool Company are beginning a series of trial demonstrations with their pneumatic riveters, &c., in the shipyard of Scott & Co., Greenock. The trials are to extend over six weeks, and shipbuilders from all over the kingdom are being invited to come and see the work done on a vessel in actual course of construction. Pneumatic tools are not a novelty here, as some of the newspapers seem to suppose. They have been in use for some time in most of the principal yards, but not so largely as they are destined to be when the prejudice of the British workman is overcome.

Successful Turbine Steamers.

The second Clyde built turbine passenger steamer is just taking her place for the summer traffic of our beautiful Firth. The "King Edward," built by Wm. Denny & Bros, last year was so successful an adaptation of the Parsons steam turbine that the "Queen Alexandra" has been built by the same firm through the winter to support her. The "Queen Alexandra" is a river saloon boat, 270 feet in length, 32 feet in breadth and 11½ feet in depth. The engines supplied by the Parsons Turbine Company consist of three separate turbines, each driving its own shaft. The center turbine is high pressure, the two side turbines are low pressure. The total ratio of steam expansion is about 125 fold, as compared with 8 to 16 fold in triple expansion reciprocating engines. At ordinary steaming rate the velocity of the center shaft is about 700, and of each of the side shafts 1000 revolutions per minute. There are five small propellers, one on the center shaft, and two on each of the side shafts, but when the center shaft is not used, as in maneuvering, the center propeller runs free. Reversing is done by means of astern turbines placed inside the exhaust ends of the low pressure turbine cylinders, which reverse the action of the two shafts. Steam is generated by an ordinary Scotch boiler built by Denny & Co. The "Queen Alexandra" has opened her career with a speed of 21⅝ knots, which is 1¼ knots better than her predecessor and consort, the "King Edward;" and she runs with perfect smoothness and without vibration. These two vessels have lifted the steam turbine out of the region of experiment.

The Coal and Iron Trades.

The settlement in the Scotch coal trade, to which reference was made in a recent letter, is now completed. It comprises the reconstitution of the Conciliation Board with power to adjust wages between a minimum of 5 shillings 6 pence and a maximum of 8 shillings per day, in relation to the selling price of coal. The net average price is to be ascertained by periodical examination of coal owners' books by duly appointed accountants, but besides the price the condition and prospects of trade are to be considered by the board in regulating wages from time to time. The arrangement has been unanimously accepted by the men, and promises to insure peaceful relations and steady working in our mining industry.

This has helped to give a better tone to our iron trade, already a good deal braced up by American reports and South African prospects. Whitsuntide did not interfere with industrial production in Scotland, though it closed the warrant market for a day or two. There has since been a good deal of buying of warrants to close "shorts," and there has also been a good deal of buying of Cleveland warrants by bulls. There is now little difference in price between Cleveland and Scotch; consequently the shipments from Cleveland to Scotland have dropped off by a trifle, and there has been no compensating Continental demand. Nevertheless the price of Cleveland iron is upheld by hope and by actual or prospective American requirements. The real extent of the sales to America is not known to the market, but it is believed that the major portion of the Middlesbro warrant stock is now held in London on American account. Some more orders have also been received from your side for Scotch pig iron, and also for scrap steel. Finished iron and steel makers are kept pretty busily employed, but prices are low compared with last spring and costs are not very much lower.

B. T.

A Dinner of Welcome to O. P. Letchworth.

Representatives of the foundry trade united in tendering a dinner of welcome to O. P. Letchworth of the Pratt & Letchworth Company, Buffalo, N. Y., on the evening of June 12, at the Café Martin, New York. Mr. Letchworth had returned to this country on the previous Tuesday after a three months' trip abroad, and the suggestion by prominent members of the American Founders' Association that his arrival home should be fitly celebrated met with a cordial response. A committee composed of William D. Sargent of the American Brake Shoe & Foundry Company of New York; Herbert B. Atha of the Atha Steel Company, Newark,

N. J., and Gilbert H. Johnson of Isaac G. Johnson & Co., Spuyten Duyvil, N. Y., attended to the arrangements. Those who united in giving the dinner, in addition to the committee, were as follows: M. H. Barker, American Tool Machine Company, Boston, Mass.; F. T. Towne, Yale & Towne Mfg. Company, Stamford, Conn.; S. J. Meeker, Newark, N. J.; C. C. Smith, Union Steel Casting Company, Pittsburgh, Pa.; C. M. Greiner, Pitts Agricultural Works, Buffalo, N. Y.; Fred. Frazer, Frazer & Jones Company, Syracuse, N. Y.; Stanley G. Flagg, Jr., Stanley G. Flagg & Co., Philadelphia, Pa.; Richard C. Oliphant, Trenton Malleable Iron Company, Trenton, N. J.; Antonio C. Pessano, Great Lakes Engineering Works, Detroit, Mich.; Willis Brown, Walker Foundry Company, Erie, Pa.; Elias M. Johnson and Isaac B. Johnson, Isaac G. Johnson & Co., Spuyten Duyvil, N. Y.; John A. Penton, of the *Foundry*, and secretary of the National Founders' Association, Detroit, Mich.; A. I. Findley of the *Iron Trade Review*, Cleveland, Ohio, and George W. Cope of *The Iron Age*.

Mr. Sargent acted as toastmaster and most acceptably filled the duties of this position. Responses were made by Messrs. Penton, Pessano, Cope, Findley and Brown. Mr. Letchworth, in an extremely felicitous speech, expressed his pleasure at the warmth of his reception on his return to the United States, and after some allusions to his experience abroad, glowingly expressed his gratification at his safe arrival home. The occasion was a delightful one which was greatly enjoyed by all the participants.

Dominion Steel Company Take Over Dominion Coal Company.

The shareholders of the Dominion Iron & Steel Company met in Montreal at noon on Thursday. At 3 p.m. the same day the shareholders of the Dominion Coal Company met. The principal business before the meetings was the ratification of the lease of the coal company to the iron and steel company.

The Steel Company Meeting.

H. M. Whitney, being still absent in Europe, the chair was taken by the acting president, Senator Forget. John Morrison objected to guaranteeing the coal company's shareholders 8 per cent. unless a like guarantee be made to the holders of the common stock of the steel company. James Ross, managing director, stated that this was not a proposal to amalgamate the two companies, though he would be glad if it were. The agreement was for an option of lease which was to take the place of another option of lease of the coal properties given the steel company in 1899. The old option by its terms would expire this year if something were not done.

Senator Cox said that the matter had for weeks received the earnest consideration of the shareholders of both companies. He considered that they had acted in the best interests of both companies, explaining that the option which the steel company had on the coal company's property would have been forfeited at the end of this year. It would, he thought, lead ultimately to the amalgamation of the two companies. There was every reason to believe that the coal company would earn far in excess of $1,600,000, which the steel company would by their agreement pay, and indeed they were sanguine that the profits of the coal company would pay all the fixed charges of the steel company.

A stock vote was then taken on the resolution to confirm the new lease, and it was adopted by 210,000 shares against only 150 to the contrary.

The report of the directors of the Dominion Iron & Steel Company, Limited, for the year ending April 30, 1902, signed by Senator Mackay, acting president, is given in part as follows: During the past year the company have steadily pressed forward with their construction work, and your directors have to report that, with the exception of the rail mill, the entire plant is now almost completed. As might be expected, the output during the time when the plant was still under construction did not realize working expenses, but your directors anticipate that the expenses will now show a reduction each succeeding month. The mistake which has proved the one most detrimental was that of not keeping the washing plant well ahead of the blast furnaces. It was originally calculated that it would be necessary to wash only one-third of the coal required for use in these furnaces, but experience has demonstrated that in order to insure first-class results it is necessary that the entire supply should be washed. Since, therefore, the washing plant has now been enlarged, this handicap on the production of the blast furnaces is removed. As regards the quality of the product, your directors think that the company have every reason to congratulate themselves. The steel manufactured by the company is of the first quality, and has everywhere given satisfaction.

The balance sheet up to April 30, 1902, is as follows: Assets, property account, $29,419,534.62; cash, $97,983.20; accounts receivable, $591,198.43; product on hand, $590,793.62; raw material on hand, $600,983.65; warehouse material on hand, $296,894.53; total, $31,597,388.05. Liabilities, bonds, $8,000,000; common stock, $15,000,000; preferred stock, $5,000,000; notes payable, $2,589,550.54; accounts payable, $955,396.14; reserve for replacement, $52,441.37; total, $31,597,388.05. Since the close of this report 50,000 shares of common stock has been underwritten at $60 per share. This will bring the sum of $3,000,000 (less commission) into the treasury by July 11, and will be used for reducing the debt and further improving the property.

The old Board of Directors was re-elected for the ensuing year as follows: H. M. Whitney, Boston; Sir W. C. Van Horne, Montreal; Hon. Geo. A. Cox, Toronto; Hon. David MacKeen, Halifax; Hon. Robert Mackay, Montreal; H. F. Dimock, New York; Almeric H. Paget, New York; James Ross, Montreal; F. S. Pearson, New York; R. B. Angus, Montreal; J. S. MacLennon, Sydney; Elias Rogers, Toronto; W. B. Ross, Halifax; B. F. Pearson, Halifax; Hon. L. J. Forget, Montreal.

The Coal Company Meeting.

Vice-President James Ross presided at the meeting of the Dominion Coal Company. The output from the beginning of 1895 to February 28, 1902, was shown to be as follows:

	Tons.		Tons.
1895	884,000	1899	1,295,543
1896	1,169,785	1900	1,739,374
1897	1,221,471	1901	2,044,877
1898	1,061,669	1902	2,651,263

The annual report proceeds as follows: "Owing to this increase in the business of the company, as shown by the above statement, it has been necessary to add largely to the mining plant and machinery, railway and equipment, shipping piers, houses for employees, &c.; and during the past year nearly $1,000,000 have been spent on such extensions and improvements.

"The company have succeeded during the past year in placing their coal in the European markets, where it is well thought of, and when Colliery Dominion No. 2 is completed the company will have a market across the Atlantic for any surplus that they may not be able to place among their customers in Canada, Newfoundland and the United States.

"The coal areas of the company have an extent of 140 square miles, and the known seams over 3 feet in thickness are estimated to contain 1,500,000,000 tons. There are six collieries at present in operation, known as Dominion No. 1, 90,000 tons per month; Dominion No. 2, 30,000 tons; Dominion No. 3, 35,000 tons; Caledonia, 70,000 tons; Reserve, 75,000 tons, and International, 17,000 tons. These collieries have been equipped with the most modern machinery for mining, hauling and hoisting the coal. They are thoroughly ventilated. The bank heads, engine and boiler houses and pit bottoms of the first four are electric lighted.

"During the past year the surplus earnings of the company amounted to $937,681.44, and there has also been deposited in addition $122,939.55 in the sinking fund for the redemption of the company's bonds. This latter amount, together with interest on $125,000 reserve sinking fund, is sufficient to retire $115,000 of these bonds, by which the bonded indebtedness will be reduced to $2,589,500."

The report was adopted, the lease confirmed and the following directors elected: R. B. Angus, H. F. Dimock, Hon. L. J. Forget, Hon. David MacKeen, J. S. MacLennon, F. S. Pearson, James Ross, W. B. Ross, Lord Strathcona and Mount Royal, Sir W. C. Van Horne, H. M. Whitney and Hon. George A. Cox.

At subsequent meetings of the directors James Ross of Montreal was elected president of both steel and coal companies, and Hon. George A. Cox, Toronto, and Hon. L. J. Forget, Montreal, were elected vice-presidents.

C. A. C. J.

The Effect of Melting Steel With Iron in the Cupola.*

BY H. E. DILLER, CHICAGO, ILL.

It is well known that melting steel with iron in a cupola adds strength to the resultant casting. But to what degree this is so and the best proportion of steel to use are not so clearly understood. With a view of learning something more definite in regard to these two subjects, and also to see if it were possible to trace some connection between the percentage of total carbon in the iron and the tensile strength, I have made the tests given in the accompanying table. The tensile and transverse strength given are the average of two, and in some cases three, test bars. For the tensile strength a 1⅛-inch round bar was used. The transverse strength was obtained from a 1-inch square bar placed on supports 12 inches apart.

The object sought in the following classification is to have the silicon about equal in the tests of each set, the amount of the other elements being as nearly alike as it was possible for me to get them.

Tests Nos. 1 and 2 show comparatively little difference in the chemical contents, except in the manganese and graphite. As the manganese in No. 1 should be beneficial to the strength of the bar, the only way to account for the greater strength of the iron from No. 2 is the lower percentage of graphite, or the molecular structure resulting from the 25 per cent. of steel in the mixture.

Comparing Nos. 3 to 7 we find that the strength increases with the percentage of steel used, and the decrease of total carbon with the exception of No. 7. In this 37½ per cent. of steel was used, and the total carbon was less than in any other test, but it is weaker than either No. 5 or No. 6. This being a solitary case, it can hardly be used as proof that 37½ per cent. of steel is more than it is well to melt in a cupola. But test No. 11, which also contained 37½ per cent. of steel and more carbon, was only a little stronger.

Test No. 4 was considerably weaker than No. 5, but its higher percentage of sulphur with its lower combined carbon would seem to indicate that these bars were either cooled slower, or poured from duller iron than were the bars from No. 5, which may account for their being weaker than the No. 5 bars.

In looking at Nos. 8 to 11 we see that No. 9, although containing 12½ per cent. of steel, is no stronger than No. 8, in which there was no steel. And No. 10, with 1.06 combined carbon and 12½ per cent. of steel, gives less strength than might be expected. As these tests are so much lower in manganese than Nos. 8 and 11, it may be that their weakness is due either to the lower manganese or to the conditions of melting, which reduced the percentage of manganese so much more than in Nos. 8 and 11. The four charges each contained about 0.50 managnese before melting.

Nos. 13 and 14, each from charges containing 25 per cent. of steel, show a marked increase in strength over No. 12.

We find that all the tests from charges containing 25 per cent. of steel are stronger than those from the charges containing but 12½ per cent., with the exception of No. 5, which is stronger than two of the tests which had 25 per cent. of steel in the mixture.

The tests were made with pig iron, ferrosilicon and steel scrap, no cast iron scrap being used. This was done in order to better control the percentage of the elements in the iron.

In some cases in which a large percentage of steel was added, it was necessary to use ferrosilicon to get the desired amount of silicon in the charge. To see how this and the steel mixed with the pig iron, two tests were taken from No. 13, which contained 1000 pounds of steel, 400 pounds of ferrosilicon (8.5 per cent. silicon) and 2600 pounds of pig iron. The charge was tapped from the cupola into a ladle and the tests taken at different times as the iron was being poured from the ladle. The one sample contained 2.53 and the other 2.54 per cent. of silicon.

Two tests taken in the same way from No. 14 contained 1.97 and 1.94 per cent. of silicon. This charge was made up of 1500 pounds steel, 450 pounds ferrosilicon and 2050 pounds of pig iron.

No.	Sili-con.	Sul-phur.	Phos-phorus.	Man-gan-ese.	Comb. C.	Graph-ite.	Total C.	Ten-sile str'gth.	Trans-verse str'gth.	Per ct. of steel.
1	1.43	0.047	0.564	0.82	0.67	3.14	3.81	23,060	2,550	0
2	1.50	0.065	0.532	0.33	0.64	3.44	3.08	30,500	2,840	25
3	1.76	0.062	0.488	0.53	0.51	3.12	3.63	22,180	2,440	0
4	1.76	0.139	0.515	0.57	0.43	2.94	3.37	27,090	2,770	12½
5	1.77	0.069	0.339	0.49	0.56	2.87	3.43	32,500	3,120	12½
6	1.83	0.100	0.610	0.55	0.51	2.44	2.95	36,860	3,280	25
7	1.75	0.089	0.598	0.35	0.74	2.12	2.86	30,160	3,130	37½
8	1.96	0.104	0.446	0.44	0.63	3.18	3.81	21,950	2,230	0
9	2.12	0.037	0.410	0.26	0.38	3.26	3.64	21,890	2,470	12½
10	2.16	0.060	0.315	0.20	1.06	2.30	3.36	26,310	2,670	12½
11	1.97	0.093	0.470	0.48	0.57	2.83	3.40	32,530	3,050	37½
12	2.35	0.061	0.515	0.56	0.54	3.40	3.94	21,990	2,200	0
13	2.53	0.104	0.490	0.54	0.60	2.56	3.16	33,390	2,850	25
14	2.36	0.064	0.327	0.24	1.08	2.15	3.23	31,560	3,200	25

Similar tests from charge No. 2, which was made up of 1000 pounds steel and 3000 pounds pig iron, contained 1.50 and 1.52 per cent. of silicon.

These three cases offer pretty strong proof that the pig iron, steel and ferrosilicon mixed thoroughly.

Although of a limited number, the tests given seem to indicate that 25 per cent. of steel will add about 50 per cent. to the strength of the iron; and 12½ per cent. of steel, approximately 25 per cent. The tests containing 37½ per cent. of steel were hardly as much improved in strength as those with 25 per cent. of steel, from which we may infer that the limit of the amount of steel it is beneficial to melt with iron in a cupola is between 25 and 37½ per cent.

* Paper read at the meeting of the American Foundrymen's Association, Boston, June, 1902.

Drawback on Structural Material.

WASHINGTON, D. C., June 17, 1902.—An interesting series of drawback regulations have been prepared by the Treasury Department upon the application of the American Bridge Company for the exportation of structural material consisting of beams, angles, rounds, flats, &c., manufactured from imported steel scrap and wrought iron scrap. The open hearth system is used in the manufacture of this material and the imported scrap mixed with varying proportions of domestic iron is converted into ingots, thence rolled into blooms, and finally to finished sections.

In the investigation upon which these regulations are based it was ascertained that in the course of manufacture there is a loss of about 4 per cent. of the imported materials which cannot be recovered, and a further loss of about 10 per cent in the shearing of scrap which can be recovered, and for which, inasmuch as it is not exported, no allowance is made. Therefore, on the basis of each 100 pounds of scrap imported the Government makes an allowance of 4 pounds lost in the course of manufacture and deducts 10 pounds for valuable scrap. Inasmuch as each heat or melting contains a different amount of imported material, no uniform rate of allowance is fixed, but the following general regulations will be issued:

On the exportation of channels, beams, angles and other structural material entering into the construction of bridges for export, manufactured by the American Bridge Company, Philadelphia, Pa., in part from imported steel and iron scrap, a drawback will be allowed on the imported material therein used less the legal deduction of 1 per cent. The drawback entry must show the quantity of each kind of material exported, and, further-

more, that, in addition to the usual averments, the exported merchandise was manufactured of materials and in the manner set forth in the manufacturers' sworn statement, as made from their records, which must be filed with the Collector of Customs at the port of exportation, and officially verified prior to liquidation of entries by comparison of books and records of the manufacturers, which shall at all reasonable times be open to the inspection of customs officers. The quantity of the articles exported shall be ascertained by the export officer and weights verified by a United States weigher. In the liquidation of the entries a sworn statement of the amount of imported scrap used must be filed with said entry, and no allowance shall be made on the valuable waste, but there shall be allowed in each 100 pounds of the imported scrap exported 4 pounds as nonrecoverable waste. W. L. C.

Suggested British Standardization of Pipe Flanges and Flanged Fittings.

A paper read at a recent meeting of the Institution of Mechanical Engineers, by Robert E. Atkinson, proposed certain standards for pipe flanges and flanged fittings. These standards may be studied with interest in view of those generally adopted in this country for flanges for high pressures, and which were published in *The Iron Age* of October 10, 1901. In his opening remarks the author said that the lack of universal agreement among engineers respecting dimensions of flanges for steam pipes, valves, &c., and general over all measurements of flanged fittings and connections, was a source of much inconvenience and expense, which could be largely prevented by the adoption of satisfactory standard dimensions for these goods. The want of interchangeability was, he said, keenly realized in any class of work when breakdowns occur. Delays were frequently involved in obtaining renewals of valves or fittings, and in the case of electrical power installations this might entail serious loss. After detailing the various incidents which had led up to the devising of the tentative standard tables suggested as those which might perhaps be adopted, the author proceeded to explain the tables themselves. In preparing the standard the following guiding principles had been adopted: Uniformity of outside diameter of flanges for varying conditions; uniformity in the number of bolt holes, and diameter of bolt circle; the number of bolts should, in all cases, be divisible by four. The flanges had been all designed in thickness to withstand a working pressure of 250 pounds on the square inch. These thicknesses were calculated with an allowance for the tensile breaking strain of 4 tons per square inch, with a minimum factor of safety of 20. This calculation took it for granted that the flanges were flat faced, and that the jointing material extends over the entire face of the flanges. The variations in the pressure at which the pipe was to be worked could be allowed for in the thickness of the flanges, which might be reduced if necessary from the figures given, so as to render them suitable for lower pressures than the maximum. Then as to bolts, the sizes of these as given in the paper had been calculated on the assumption of an average breaking strain of wrought iron at 22 tons to the square inch, with a factor of 6 as a minimum. In the smaller bolts the factor of safety is much increased, as an altogether disproportionate strain can be placed on the bolt by screwing up. The numbers of bolts were apportioned to the various pipes as follows: For pipes from ½ to 2½ inches, inclusive, four bolts; for 3 to 7 inch pipes, eight bolts; for 12 to 16 inch pipes, 16 bolts; for 17 to 20 inch pipes, 20 bolts, and for 21 to 24 inch pipes, 24 bolts. The change from four to eight, occurring as it does on the 3-inch pipes, necessarily makes the number of bolts for this size more than is strictly required; but the only alternative is either to adopt a number not divisible by four, or to use only four bolts, which would make the circumferential pitch as much as 4.71. This would be altogether excessive for a flange when working at, say, 250-pound pressure. In determining the pressure on the bolts the steam pressure was multiplied by the area of the bore of the pipe and divided by the collective cross sectional area of the bolts at the bottom of the thread. The largest circumferential pitch permitted in the proposed standard is 4.51 inches.

It was also proposed to apply the same system of standardization to the various kinds of fittings. In this case the guiding principles observed had been: A minimum number of dimensions; interchangeability of the various types of fitting for each size of pipe—as, for instance, a bend should fit the position occupied by a tee, if required, and *vice versa*, and that the over all dimensions should bear a proportionate relation to the size of the flange.

The Harbison-Walker Refractories Company.

Thomas L. Chadbourne, Jr., of Chicago, who is arranging the consolidation of the leading fire brick interests of the country, has informed the *Financial Chronicle* that it has been deemed advisable by the financial people concerned to call the new corporation the Harbison-Walker Refractories Company, on account of the strength and age of the present Harbison-Walker concern, and their long identification with the fire brick business. Mr. Chadbourne represents a syndicate of capitalists which has underwritten the new company's securities. The consolidation, it is said, is assured by the fact that the manufacturers have oversubscribed the allotment to them under their options by some $2,000,000.

The new company will acquire the following corporations, with works and daily capacity (number of bricks) as shown:

	Capacity.
Harbison-Walker Company	430,000
Constituent properties with total daily capacity: Clearfield, Pa. (2), 65,000; Hay Station, Pittsburgh, Pa. (3—one operating in magnesite and chrome), 90,000; Blandburg, Pa. (2), 60,000; Mt. Union, Pa., 60,000; Grampian, Pa., 30,000; Twenty-second Street, Pittsburgh, Pa., 40,000; Woodland, Pa. (2), 50,000; Olive Hill, Ky., 35,000.	
Clearfield Fire Brick Company, Clearfield, Pa. (2)	45,000
Isaac Reese & Sons Company, Manorville, Pa., Cowanshanock, Pa., and Retort, Pa. (2)	55,000
Phillipsburg Fire Brick Company, Phillipsburg, Pa.	55,000
Wallaceton Fire Brick Company, Wallaceton, Pa.	22,500
Basic Brick Company, Johnstown, Pa.	50,000
Clinton County Fire Brick Company, Lock Haven, Pa. (Millhall, Pa., 22,500, and Monument Run, Pa., 15,000)	37,500
Fredericks, Munro & Co., Farrandsville, Pa.	45,000
American Fire Brick Company, Lock Haven, Pa. (works at Millhall, Pa.)	30,000
Layton plant of Fayette Mfg. Company	20,000
Total (27 works) daily capacity	790,000

Regarding the foregoing, Mr. Chadbourne says: "Two-thirds of the 27 plants are of brick and iron construction, all containing costly and heavy machinery; 16 of them have been constructed within five years. The buildings, machinery, 50 miles of tram and railroads and 325 employees' houses could not be duplicated at the present time for less than $7,000,000 cash, in addition to which the company will have $1,900,000 quick assets consisting of stock on hand at cost, guaranteed book accounts and cash. Besides these items the company will hold in fee and under favorable lease some 52,000 acres of fire clay, ganister and coal lands on which it is difficult to put a correct estimate of value, because it would be impossible for any amount to duplicate the lands in quality and location. There is no business in existence in which more time, care and attention is necessary to establish a high reputation, as fire brick linings and blast furnaces should run from four to eight years and blast furnace stoves from 10 to 16 years, and a good many records are necessary to establish the quality of material turned out for the heat such material is to be subjected to."

The proposed total issue of bonds and stock for the acquirement of the aforesaid property will be approximately:

Five per cent. 20-year first mortgage and collateral trust sinking fund gold bonds	$3,500,000
Six per cent. cumulative preferred stock in $100 shares	8,000,000
Common stock in $100 shares	14,250,000

Of the bonds $1,500,000 will be used for the purpose of refunding the present bond issue of this amount of the Harbison-Walker Company.

The following, with others, will be the directors: H. F. Bigler, H. W. Croft, F. H. Wigton, George Reese, S. C. Walker, R. W. Fredericks, Alexander Paterson, Moore Fredericks, S. P. Harbison, F. H. Seeley, W. N. Stanton, T. L. Chadbourne, Jr.

The companies to be absorbed embrace about 90 per cent. of the high grade fire brick manufacturers of Pennsylvania.

Trade Publications.

Gearing.—The R. D. Nuttall Company of Pittsburgh have issued a book containing a few plain and concise rules for ordering cut or planed gearing, and also tables which are of special value. The company are prepared to furnish spurred gearing up to 15 feet diameter and 24 inches face, bevel and miter gearing up to 8 feet diameter and 24 inches face, and worm gearing up to 6 feet diameter. The tables embrace diametrical pitch, with its equivalent in circular pitch, depth of space and thickness of tooth; circular pitch, with its equivalent in diametrical pitch, depth of space and thickness of tooth, and rules for finding the other factors from the one given. Other tables of interest are equivalents of millimeters in decimals of inches, circumferences and areas of circles, standard gauges, standard metric screw threads, weights of materials, &c.

Electric Motor Vehicle Equipments.—The Westinghouse Electric & Mfg. Company have recently issued a very interesting and attractive circular describing electric motor vehicle equipments. This company have for five years supplied motors to the electric vehicle industry and now offer a complete line of standard automobile equipments, comprising everything of an electric nature, except storage batteries, pertaining to the motive power of an electric vehicle of any type or size.

Steam Hammers.—A beautiful catalogue, splendidly illustrated, has been received from Bement, Miles & Co. of Philadelphia. For several years these hammers have been considered standard, and a separate department of the large works of the company is devoted exclusively to their manufacture. The catalogue divides the complete line into five classes, which fully cover all the requirements of modern forge practice. All parts are regularly manufactured in stock sizes of uniform dimensions and are interchangeable. Their cast iron or steel frames are furnished according to requirements. Their double open frame hammers were designed for forging special pieces requiring an unusual amount of working space. These are made in three sizes, 6000, 8000 and 10,000 pounds, being rated by the weight of the ram and attached parts. They take steam above and below the piston. The valve is perfectly balanced, easily handled and of great durability. The valve gear, which is hand operating only, is simple and substantial, producing every desirable variation in length, position, rapidity and force of blow. The piston can be raised above the top of the cylinder for the insertion of rings. The anvil is made with a separate cap which can be removed without disturbing the hammer. Their 12-ton double open frame hammer is intended for especially heavy forgings requiring a large working space. The frame is made up of steel plates. All their steam drop hammers are double acting—namely, taking steam above and below the piston and give not only single or successive dead blows like an ordinary power drop, but they may be run automatically, or by hand or foot, at any desired length of stroke for light or heavy blows, in the same manner as their standard steam hammers. They are particularly valuable for drop or stamp work, forging or finishing; cutting apart can be done under different parts of the same die. Their 1600 pound single open frame steam hammer is intended for forging irregular shapes such as cranks, marine rudders, &c., and more particularly still for welding pedestal jaws on locomotive frames.

Jewelers' Rolling Mills, Presses, Wire Forming Machines.—A very comprehensive catalogue has been received from Blake & Johnson of Waterbury, Conn., covering the many lines of machines manufactured by them. Their rolling mills are built with hardened Krupp cast steel rolls for rolling gold, silver, platinum, brass, steel and all other metals. Their four sided wire forming machine for forming round, square or flat wire into almost an infinite number of shapes takes the wire from the coil, straightens it, cuts it to length, forms it, and drops it from the machine finished. It differs from the ordinary wire forming machine in that the piece of wire after being cut off is pressed against the former by the front die, carrying the former back to an adjustable stop and making the first bend in the wire. Here it is in position to be acted upon by the side and rear dies. These tools, being straight, have more strength and are more simple and less expensive to make than tools which are offset. By the use of the sliding former the piece of wire is in position on the former until finished; consequently many shapes may be made from wire with this machine that cannot be made with machines having the ordinary stationary former. The feeding device is so arranged that any lengths of wire within the capacity of the machine can be cut uniformly accurate. The firm have just remodeled their double stroke riveting machine. The special feature is the adjustment which in other machines is made from underneath, but in this is made on top, where it is most convenient. Special shapes and special sizes of heads that require more stock for the heads than would be used for the common rivet or screw blanks may be formed on this machine. Their thread rolling machines are made in various sizes for handling different kinds of stock. By this process the thread has greater strength than one cut, as no stock is removed, while the otutside, which is the best, is rolled up to form the thread.

The Iron Industry in Australia.

MELBOURNE, May 21, 1902.—Quite recently *The Iron Age* commented on the possibilities of the establishment on a large scale of iron works in Australia to supply local requirements and compete to that extent against the manufactured iron of America and Great Britain. It will be interesting to watch developments in connection with the successful flotation in London of a company with a capital of £750,000 to acquire and extend the business of the Eskbank Iron & Steel Rolling Mills, at Lithgow, New South Wales, owned by William Sandford, Limited.

William Sandford, who is at present in London, has worked untiringly for many years, and his perseverance and energy have borne fruit latterly to the extent of building up a sound business.

The earlier history of the Eskbank works, which were founded in 1874, was of a varied nature, and it was not until 1881 that anything like success was attained. The original intention was to work the ore deposits of the Lithgow district, but that scheme had to be abandoned some 15 years ago, and since then the works have been confined to the rerolling of scrap iron. It is understood that the new company will develop the local ore under the Federal Bonus bill, details of which scheme were recently reported in the columns of *The Iron Age*. It would seem that Mr. Sandford has quietly anticipated the plans of the Blythe River Syndicate in connection with the founding of this industry in Australia.

The Federal Bonus bill, the freedom of the Australian market, now untrammeled by border duties between the States, and the protective duty which will doubtless follow the bonus system, should prove material help to the new company in their endeavor to pay dividends on their £750,000 capital. It remains to be seen, however, whether even this support will be sufficient to outweigh the heavy cost of carriage on the crude ore to the works, say 100 miles, and on the finished iron to the port of Sydney, another 100 miles. The richest ore deposits of New South Wales are in the Cadia and Carwar districts, out Orange way, and it is believed that these are the deposits to be worked. The Government geological surveyor recently estimated the former to contain some 39,000,000 tons, but the value is not proven. The latter deposits show about 3,000,000 tons in sight averaging 53 per cent. of iron.

The Government statistician estimates the annual

value of imported iron and manufactured iron into Australia at £5,300,000, so that the market seems worth making a bid for. It is about fair to say that freights from the United States to Australia will be not much more than railway and rehandling charges on Lithgow iron to various parts of Australia. In fact, it is more than likely that in many instances they will be less. The bonus, of course, has to be reckoned with, and against this we may place the cheaper cost of production in the United States, for it is difficult to realize that Australian labor conditons, smallness of output, cost of coal, coke and flux, &c., will permit of production at anything like the figures of cost in the United States.

None the less the enterprise is one which should merit success, for William Sandford has the reputation of being a shrewd and practical man whose whole life has been devoted to the successful establishment of the Australian iron industry. At the same time £750,000 is a huge capital on which to pay dividends in a small market, and it is currently reported that the original idea was to float a company with one-third this amount of capital. We understand that the new company have ordered two blast furnaces, steel furnaces and rolling mills. The Lithgow works at present employ about 400 hands.

Oil Fuel in the Navy.

For many years, both in this country and abroad, experiments have been in progress looking to the use of oil on board ship. While oil has been employed successfully aboard freight and passenger steamers, particularly those obtaining their supplies of fuel from the Russian fields, but little has been accomplished on war ships. This is to be regretted, since the demand for the latter class of vessels is more exigent. Space is more valuable, weight is more restricted and every attempt is being made to reduce labor. It is therefore interesting to note, in accordance to dispatches to the press, that Admiral Melville announces that the tests begun at Washington will prove of interest to all marine engineers. So far, the trials with oil under forced draft have developed several objectionable features. While these are described as new they have been rather well known in stationary engine practice. One of these, a heat so intense as to endanger the fire boxes, is not feared with the stationary boiler equipped for burning oil. Another, the deafening noise produced by the blast, is found in both and has up to this time proved to be unavoidable.

About a year ago the Oil City Boiler Works turned over to the Bureau of Steam Engineering for experimental purposes a boiler of the water tube type. The limitations of this boiler in regard to weight, floor space and hight were identical with those of the "Denver" class of cruisers. During the year a board of naval officers composed of Lieut.-Commanders John R. Edwards, W. M. Parks and F. H. Bailey has been experimenting with this boiler, using coal. The tests have been conducted under practical conditions, natural draft and forced draft of 1, 2 and 3 inches air pressure. The coal consumption has varied from 18 to 70 pounds per square foot of grate. Every test made under the boiler with coal will be duplicated with oil, and oil burning appliances will be thoroughly tested. The Naval Appropriation bill contains an item of $20,000 for this special purpose. The results will eventually be published by the Bureau of Steam Engineering.

Two official trials have already been made. The first was under forced draft with 1-inch air pressure. The second was also forced draft with 2 inches pressure. In reporting these tests the New York *Tribune* says:

In both cases it was found that the volume of steam generated by the oil was greater than that secured by the coal test of like character. It will be understood that in these tests no attempt was made to determine the efficiency of the combustible. The primary purpose was to evaporate a large quantity of water, or, in other words, to secure a large volume of steam independent of the cost. Under forced draft conditions, whether coal or oil is used, economical results cannot be expected. The two official tests that have already taken place show that the board of naval officers has secured a greater output of steam with oil than was obtained with one of the best qualities of Pocahontas coal. Compared with like conditions when coal was used, the efficiency of oil is 40 per cent. greater than that of coal. The experiments, however, will be conducted for a considerable period, for not only will various qualities of oil be used, but many forms of burners will be tried.

In view of the fact that there are hundreds of forms of burners, it will only be possible for the experimental board to try representative types. Individual inventors will be expected to attach their burners at their own expense and according to their own designs to the test boiler. The manner and character of the data to be collected will be solely determined by the experimental board. Comparative and valuable results can only be obtained by the board having exclusive control of the collection of all data. When a sufficient number of representative types of burners have been tested the board will begin a series of tests on its own account. In the extended series of trials it is probable that information will be secured which will show that a combination of features presented by individual inventors may give the ideal design of a burner and furnace adequate for naval needs. Should such substantial results be secured as are already indicated, it is the desire of Admiral Melville to have one large cruiser or battle ship equipped at an early day with liquid fuel appliances. It is not improbable that in the maneuvers which have been planned to take place off Culebra Island next December one of the war ships or auxiliaries may burn liquid fuel. It is also the wish of the engineer in chief that the fuel oil experiments carried on under the experimental boiler at Washington may be supplemented by liquid fuel tests under the boilers at the Naval Academy. At the Annapolis institution there is available in the first class of cadets a body of intelligent and enthusiastic young men, who would make excellent observers in the collection of data, and the officers on instruction daily at that institution would be ordered to co-operate with the main experimental board in Washington.

In noting the advantages of liquid fuel for naval purposes, it is to be particularly observed that the United States has more to gain from the adoption of this combustible for war ship purposes than any other naval power. The Beaumont field is within 40 miles of the Gulf of Mexico. There are pipe lines extending from the oil fields of Ohio and Pennsylvania to several of the Atlantic seaports. The California oil product can also be piped to the sea at slight cost. Russia is the only European country that has a comparatively inexhaustible supply, but the Russian product is a considerable distance from the sea, and the means of securing it are not as well developed as they are here. In the Burmah field England has a possible supply, but this special product could only be utilized for work on the Asiatic coast. The liquid fuel experiments under forced draft conditions that have been conducted by naval officers in the last week promise much in insuring war ships that will be the superiors of any afloat.

Kirby-Williams Company.—The Kirby-Williams Company have been organized at Pittsburgh, and are dealers in machine pipe, pipe cutting, threading and bending; also second-hand pipe and machinery. The plant of the concern is located at 216 South Main street, West End, and the firm are composed of John T. Kirby and John Williams.

The wage scale of the Amalgamated Association was signed last week by the Republic Iron & Steel Company, and it is expected most of the mills of that concern in the Central West and South will run right through the summer months, as the concern are very much crowded with orders. It is possible a few of the plants will be closed down for a short time for necessary repairs and stock taking.

The Carnahan Tin Plate Company of Canton, Ohio, an independent concern, have signed the tin plate scale of the Amalgamated Association.

The Iron Age

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The Danger of Continued Flotations of Industrial Securities.

It is a matter of some surprise, and in some quarters is causing some uneasiness, that there is no abatement in the effort to float industrial securities by the present methods. During the past few months quite a number of schemes have been presented to bankers and capitalists, but have not met with enough encouragement to permit the undertakings to be placed formally before the public. But there has been enough encouragement, or inducement, apparently, to put through a pretty steady stream of new industrials. It has looked for some time as though the many issues put on the market have not been fully digested and that the underwriting syndicates in numerous cases have only partially distributed their securities, leaving larger or smaller quantities still to be placed. Of the vast number of industrials created during the past few years some have enjoyed immediate and lasting success, while others appear to have merit enough of their own to foreshadow a future. Some have been held by the main force of powerful financial interests, while a few have drooped persistently in spite of good backing. It is a serious question what the fate of the majority of them will be when the banking interests and the capitalists who floated them have liquidated, and having distributed the underwriting profits, withdraw their support. Bankers who recommend a purchase do not undertake to guarantee any security so placed indefinitely, even though they may feel a moral obligation to watch an enterprise and exert their influence in behalf of their clients.

The general benefits to be derived by a concentration of manufacturing plant under the form of the modern industrial are undoubtedly very great and justify the expectation of increased earnings, all other conditions being identical. But nearly every one of the industrials is overcapitalized, which in itself does not mean much, since the market is supposed to reflect the actual value. But excessive capital may mean not alone unduly large fixed charges, which is very dangerous, but also a constant pressure upon the management for returns upon issues of securities which ought to have recognition only in exceptional times. The demands for dividends upon such common stock as has been issued as a bonus and represents only hopes and expectations is very demoralizing to those who conduct the affairs of any corporation. The natural tendency in the great majority of cases is to yield and thus incur the danger of draining the treasury of the very life blood of the enterprise.

The existence of these industrials in many branches of manufacturing, organized with such inherent elements of weakness, is a menace to all concerned in the lines involved, and it is for this reason that further additions to their number is viewed with uneasiness. Nor is the effect upon the general financial situation a salutary one. A good deal of capital is tied up or committed during the process of floating the securities, and a considerable part of the stocks have passed into the hands of weak holders. Some of the money realized by the original owners of the plants is known to have found a lodgment in competing enterprises, and the whole effect of the movement has been to convert free capital and accumulated savings into fixed capital. It is a well-known fact that considerable money—authorities disagreeing as to the amount—has been borrowed abroad to aid in the transfer of industrial property in this country from one set of owners to another set, and there are those who look to the contingency of the calling of those loans with some uneasiness.

It is this which is giving extraordinary interest this year to the reports on the condition of our growing crops, since they are to furnish us with the surplus to pay for what indebtedness we may have incurred abroad. If they prove disappointing we may be called upon to remit gold, which, it is true, we are exceptionally well placed to supply. If the agricultural returns are ample, money is expected to remain abundant and a continuance of our prosperity at an even accelerated rate is looked forward to by the majority of business men.

The day of reckoning for the many acts of financial extravagance committed in connection with the creation of our industrials is none the less bound to come, and every fresh creation which contains any elements of unsoundness will simply add fuel to the flames. It is the part of common business prudence to keep this fact constantly in mind.

Small versus Large Appliances.

A manufacturer having a comparatively constant demand for a tool of large capacity is almost invariably justified in adding it to his equipment. But when his processes call for such a machine only occasionally he is face to face with a problem involving the questions of first cost, running expenses, maintenance and interest charges. Further than this, if the appliance is to be used only at long intervals of time the question of a makeshift device for any particular job enters the problem with considerable prominence. It then becomes a question of relative cost between the permanent and occasional tool, both of which items can be calculated with all necessary accuracy. A manufacturer is, perhaps, never justified in buying a large tool under the supposition that he may require its services some day in the dim future. It would be wiser to omit it from his equipment unless he is reasonably certain that he will need it at a comparatively early date.

We have in mind two plants which forcibly illustrate these conditions. Both are shipyards furnished with up to date appliances in every respect. We have no comment to make upon the machine tools proper, as they are in both cases admirably designed for the work in hand. It is to the traveling crane service that we wish to particularly refer. In both instances these are moderate, but the difference in size or capacity is tremendous when we consider that the work to be done is alike in both yards. One crane will easily pick up any load destined to go aboard the ship, carry it along the ways, and deposit it at the proper spot. If desired, an engine or boiler complete can be taken direct from the erecting shop to the vessel. The other service can only handle the lighter loads, and therefore supplementary appliances must be employed for the great weights. The question is, Which is the more economical method?

A ship is composed of a multitude of small pieces of light weight, united to form the whole. For the most part, this holds true even in the case of a battle ship. Such being the case, the smaller equipment appears to

have the following advantages. Less initial cost, reduced cost of operation and maintenance, and greater speed of working. The sole drawback is that it cannot touch the heaviest loads. Time here appears as one of the governing factors. On the average the parts that can be handled by a 5-ton crane number thousands, those requiring a 100-ton crane can be counted on the fingers of one hand. A ship may be three months or three years in building, and, consequently, the large crane would be used to its full capacity only a comparatively few times during its entire existence. The rest of the time it would resemble a giant picking up chips. The cost of the occasional temporary devices to assist the small crane figure against it and must be taken from the total cost and operating account of the larger one. While comparative figures are not available, we are of the impression that the mammoth crane is an expensive luxury in a shipyard. It looks imposing, and as the traveling man says, "is a good talking feature," but in order to pay for itself it must be employed on big work. A gun lathe is a costly tool for turning dibbles.

Immigration Heavily Increasing.

A feature of every period of great prosperity in this country is the heavy increase in immigration. A movement of this character is now in progress, which is surpassing anything before known. The arrivals at the port of New York in May exceeded those in any previous month, not excepting the best month in any of the great waves of immigration which have become historic. The movement is keeping up this month, and those who are informed on the subject are of the opinion that the stream of incoming humanity from Europe will continue at flood tide throughout this year and perhaps until business conditions change for the worse in this country. It was to be expected as a result of the remarkable difference in conditions here and abroad. For the past year our manufacturing industries have been so active that the greater part of the time much difficulty has been experienced in securing a sufficient supply of skilled labor. At the same time so much work has been prosecuted in railroad building and other undertakings of magnitude that unskilled labor has been at a premium. Meanwhile, more or less depression has been experienced in Europe, and labor has been less generally employed than for ten years or more.

While too many of those who thus seek to better their fortunes in America are inclined to stop in the seaboard cities, nevertheless the great majority pass to the interior and seek employment wherever it can be found. They scatter throughout all sections, but at present a specially noticeable stream of migration is directed toward the Northwest. The cheap lands still open to settlers in that section of the Union and the good prices prevailing for agricultural products are very tempting to those who have any inclination to agriculture. Nor is the movement confined to our side of the northern boundary. Northwestern Canada is catching quite an overflow, and a great increase in the population of the wheat growing district of Manitoba and Regina will be made this year. The movement into that section is being stimulated by the railroad companies which penetrate it. For years the railroads have been endeavoring to attract settlers, but not until now have they gone so far north in any considerable number. So important is the present migration to that territory that our manufacturers of agricultural machinery are stated to be impressed by the extent of the fresh market for their products which will thus be established. No small part of the heavy demand for merchandise in the Northwest is even now attributed to these new settlers, who need full supplies of everything when thus attacking a totally undeveloped country. Western merchants and manufacturers fully realize the importance of these great waves of immigration, and look for continued good business while they last.

CORRESPONDENCE.

American Competition in Neutral Markets.

To the Editor: Under the heading of "American Competition in Neutral Markets," an English correspondent makes some statements that are far from the facts of the case. He states that American quotations f.o.b. New York, annealed, drawn, varnished fine wire, £6 10s. 8d., or at $4.85 per pound, equal to $31.68; while at the same time the American manufacturers are paying $36 per ton for their wire rods, which he claims are short tons, and that makes out that the barb wire is sold abroad for $9 per ton less than their raw material. While he is in error in figuring rods as short tons, we will let that pass. It seems your English correspondent was not aware of the fact that since the beginning of this year we have imported steel billets suitable to be made into wire rods, at a cost, duty paid, for less money than we could purchase domestic billets for, for the writer recently saw large quantities of 4-inch billets in the yards of several of the American wire rod makers which were bought for export trade, and in doing so a rebate per gross ton of 99 per cent. of the duty was given to the American manufacturer, and this made his billet cost about $24 instead of $36 per short ton. Further comment on this point is unnecessary to prove that your English correspondent was wrong in his statements and calculation.

In reference to the other quotation of £10 7s. 6d. the same rule applies, and as the American community are benefited more than injured by the transaction he has no cause to complain, seeing that without this rebate at the present time, at least, we could not export barb wire fencing.

In closing his comments he tries to show how the American manufacturer can sell barb wire for export trade at $9 less than the price of raw material and 30 per cent. less than sold for to the American trade, and it is as follows: "These are the fair examples of your success in capturing our markets; it can be imitated by anybody with a long purse, but more satisfactorily when it can be so arranged that the community which pays for your losses never gets any profit." All this is nothing more or less than a slap at our tariff laws.

In reply to our English friend who has the interest of our community so much at heart, will state broadly that protection has been the greatest blessing above all other legislation to the American community. It stimulated industry to such an extent and caused such keen competition—especially in the manufacture of iron and steel—that at one time all material of that character could be bought cheaper in Pittsburgh than anywhere else in the world. Oh! what our community suffered when Bessemer pig was sold for $9 per ton, 4-inch steel billets for $14 per ton, wire rods for $20 per ton (all long tons), bar steel at 83 cents per 100 pounds or $18.60 per gross ton, less than £4 per long ton, when nails were sold at 90 cents per keg of 100 pounds, barb wire at $1.45 per 100 pounds. Under such condition what a suffering community; yes, consumer as well as manufacturer. I claim that in spite of the tariff during the period from 1890 to 1900 iron and steel material was sold cheaper on an average in Pittsburgh than it would have cost to deliver same from Great Britain and delivered there without the duty added. I claim that we can pick out five years during that period between 1890 and 1900 when iron and steel material was sold for less money in Pittsburgh than it could be bought for in Liverpool. I call upon any of our free trade advocates to prove the contrary, but let them never mind asking: "If so, why have protection?" I am only giving facts, not reasons.

If the above is anywhere near correct let your English correspondent tell us where the community of this country, with its laboring man at $1.50 per day against 75 cents in Great Britain, suffers from protection.

WM. GARRETT.

CLEVELAND, OHIO, June 14, 1902.

The American Foundrymen's Association.

The seventh annual convention of the American Foundrymen's Association is being held in Boston this week. The headquarters of the association are at the Hotel Brunswick, while the business sessions are held in Huntington Hall of the Massachusetts Institute of Technology, in the immediate vicinity. An excellent representation of the membership is in attendance, as well as a considerable number of persons connected in various capacities with the foundry trade. Following is a list of those enrolled up to Tuesday night:

Dr. Richard Moldenke, New York.
Henry A. Carpenter, A. Carpenter & Sons Foundry Company, Providence, R. I.
Will L. Ducey, Will H. Hern, Fred F. Stockwell, H. R. Luther and John P. Winlock, Barbour-Stockwell Company, Cambridge, Mass.
J. F. Mills, Abendroth Bros., Port Chester, N. Y.
John W. Burr, Burr & Houston Company, Brooklyn, N. Y.
John Magee, Magee Furnace Company, Boston.
Chas. T. Colvin, Colvin Foundry Company, Providence, R. I.
L. S. Brown, Springfield Facing Company, Springfield, Mass.
Geo. H. Gibby, Condor Iron Foundry, East Boston, Mass.
Geo. H. Lincoln, Geo. H. Lincoln & Co., Boston.
Arthur W. Gibby, Mechanics Iron Foundry Company, Boston.
David Reid, Saco & Pettee Machine Shops, Biddeford, Me.
L. W. Perault, Jenckes Machine Company, Sherbrooke, Quebec.
T. J. Best, Warden, King & Son, Limited, Montreal, P. Q.
R. S. MacPherran, Allis-Chalmers Company, Milwaukee, Wis.
C. J. Wolff and Alfred Rossow, L. Wolff Mfg. Company, Chicago, Ill.
J. D. Smith, J. D. Smith Foundry Supply Company, Cleveland, Ohio.
Hugh McPhee, Eaton, Cole & Burnham, Bridgeport, Conn.
Arch. M. London, New York.
Lewis McPhee, Bridgeport, Conn.
Geo. S. Bullock, Whitehead Bros. Company, Providence, R. I., and New York.
A. W. Walker, Bartlett M. Shaw, Thomas E. Inslee and Robert Blyth, Walker & Pratt Mfg. Company, Watertown, Mass.
H. L. Prince, General Electric Company, Schenectady, N. Y.
J. W. Busch, Pratt & Cady Company, Hartford, Conn.
J. W. Winchester, Magee Furnace Company, Chelsea, Mass.
J. W. Conway, Hartford Foundry Company, Hartford, Conn.
O. C. Beck, Colorado Iron Works, Denver, Col.
T. H. Colvin, Colvin Foundry Company, Providence, R. I.
Frederick Colin, Bethlehem Foundry & Machine Company, Bethlehem, Pa.
Paul R. Ramp and W. H. Namack, American Locomotive Company, Schenectady, N. Y.
S. T. Johnson, S. Obermayer Company, Chicago, Ill.
F. M. Etting, representing E. J. Etting, Philadelphia, Pa.
D. F. Egan, Pridmore Molding Machine Company, Boston, Mass.
J. P. Goulden, Goulden Foundry & Machine Company, Columbus, Ga.
H. A. Pridmore and E. A. Pridmore, Pridmore Molding Machine Company, Chicago, Ill.
J. Gilmour, Northern Engineering Company, New York.
J. Frank Dye and E. W. Van Dye, Newport Sand Bank Company, Newport, Ky.
L. M. Fenner, New York Air Brake Company, Watertown, N. Y.
John D. Ormrod, Donaldson Iron Company, Emaus, Pa.
A. W. Link, Erie Foundry Company, Erie, Pa.
Charles Thomas, Syracuse, N. Y.
Joseph L. Anthony, Weir Stove Company, Taunton, Mass.
J. W. Dopp, Tabor Mfg. Company, Philadelphia, Pa.
W. H. Bense, Kinsley Iron & Machine Company, Canton, Mass.
D. L. Kent and W. L. Welch, representing E. L. Kent, Boston.
A. O. Backert, *Iron Trade Review*, Pittsburgh, Pa.
F. B. Foster, Geo. H. Lincoln & Co., Boston, Mass.
D. C. Warren, *The Foundry*, New York.
Fred. A. Fisher, Enterprise Foundry Company, Sackville, N. B., Canada.
Henry Hansen, *The Foundry*, Cleveland, Ohio.
W. F. Prince, International Steam Pump Company, Elizabeth, N. J.
Geo. A. Drysdale, Jr., Howard & Bullough American Machinery Company, Pawtucket, R. I.
W. Bylum, Birmingham Iron Foundry Company, Derby, Conn.
Geo. W. Cope, *The Iron Age*, New York, N. Y.
C. A. Reed, N. S. Bartlett & Co., Boston, Mass.
H. W. Johnson, Pratt & Whitney Company, Hartford, Conn.
C. C. Boyden, Matthew Addy & Co., New York.
E. H. Mumford, Tabor Mfg. Company, Philadelphia, Pa.
C. D. Palmeter and F. J. Giles, Watertown Engine Company, Watertown, N. Y.
W. E. Farrell, Diamond Drill & Machine Company, Birdsboro, Pa.
H. E. Field, Farwell Foundry Company, Ansonia, Conn.
Ronald Drysdale, Boston.
Louis Wiard, Wiard Plow Company, Batavia, N. Y.
Marton Otis, N. E. Gas & Coke Company, Boston.
Charles H. Billings, Barney & Smith Car Company, Dayton, Ohio.
Andrew MacDuff, Stilwell-Bierce & Smith-Vaile Company, Dayton, Ohio.
Fred'k A. Hoyt, Barbour-Stockwell Company, Cambridge, Mass.
E. K. MacNutt, Watertown Arsenal, Watertown, Mass.
A. K. Beckwith, Beckwith Estate, Dowagiac, Mich.
J. O. Henshaw, N. S. Bartlett & Co., Boston.
C. S. Lowell, Tabor Mfg. Company, Philadelphia, Pa.
Fred. C. Ringer, Hawley Down-Draft Furnace Company, New York.
C. S. Bell, C. S. Bell Company, East Hillsboro, Ohio.
W. H. Coffin, T. P. Kelley & Co., New York.
S. D. Tompkins, Smooth On Mfg. Company, Jersey City, N. J.
N. J. O'Donnell, Geo. H. Lincoln & Co., Boston.
B. F. Pierson, Hanson & Van Winkle Company, Newark, N. J.
Edw. B. Gilmour, Filer & Stowell Company, Milwaukee, Wis.
Alva Carpenter, A. Carpenter & Sons Foundry Company, Providence, R. I.
A. E. Martin, Pedrick & Ayer Company, Philadelphia, Pa.
E. J. Lambert, Syracuse Chill Plow Company, Syracuse, N. Y.
F. L. Bromley, Detroit Foundry & Mfg. Company, Detroit, Mich.
F. H. Ellis and Samuel M. Thompson, Barbour-Stockwell Company, Cambridge, Mass.
R. C. Bird, Broadway Iron Foundry Company, Cambridge, Mass.
R. F. Flinterman, representing F. A. Flather, Chicago, Ill.
J. F. Lanigan, Davis Foundry Company, Lawrence, Mass.
E. E. Durant, G. F. Warner Mfg. Company, New Haven, Conn.
C. F. Belcher, Walker & Pratt Mfg. Company, Malden, Mass.
Eugene R. Pommer, United States Navy, Boston.
Harry Oldfield, Watertown Arsenal, Watertown, Mass.
Richard H. Penney, Barbour-Stockwell Company, Cambridge, Mass.
Harry Gibby, Condor Iron Foundry Company, East Boston, Mass.
W. M. Fitzpatrick, S. Obermayer Company, Pittsburgh, Pa.
Edgar W. Anthony, Smith & Anthony Company, Boston.
Walter C. English, *The Iron Age*, Boston.
Wallace C. Griffith, Watertown, Mass.
Clarence H. Joslin, Merrimac Iron Foundry, Lawrence, Mass.
J. W. Littlefield, Hub Wire Works, Boston.
Hugh W. Adams, New York.
James C. Alley and R. W. Page, representing C. L. Peirson, New York.
William J. Breen, representing Hugh W. Adams, Boston.
Thos. O'Halloran, International Power Company, Providence, R. I.
L. Renick, Jr., Michigan Drug Company, Detroit, Mich.
Frank L. Codman, John C. Codman and N. S. Hart, F. L. & J. C. Codman, Boston.
A. W. Slocum, Keystone Car Wheel Company, Pittsburgh, Pa.
J. P. Pero, Malleable Iron Fittings Company, Branford, Conn.
F. H. Stevens, Somerville, Mass.
John McLaren, Phillips & McLaren, Pittsburgh, Pa.
S. H. Stupakoff, the Fullman Company, Pittsburgh, Pa.
J. S. Seaman and Charles B. Seaman, Seaman-Sleeth Company, Pittsburgh, Pa.
E. J. Lyon, Brown & Sharpe Mfg. Company, Providence, R. I.
A. E. D'Orsay, General Electric Company, Lynn, Mass.
James A. Kirby, Brown Bros. Mfg. Company, Chicago, Ill.
J. J. Burgen, Lane Mfg. Company, Montpelier, Vt.
Charles Bailey, Reliance Steel Casting Company, Pittsburgh, Pa.
G. W. Knotts, United Engineering & Foundry Company, Pittsburgh, Pa.
S. A. McRoberts, *American Manufacturer*, Pittsburgh, Pa.
James A. Murphy, Erie, Pa.
D. J. Thomas, Sterrit Thomas Foundry Company, Pittsburgh, Pa.
L. M. Jenkins, Pittsburgh, Pa.
S. D. Sleeth, Westinghouse Air Brake Company, Pittsburgh, Pa.
C. F. English, *The Iron Age*, Boston.
F. E. Gordon, Ohio Sand Company, Conneaut, Ohio.
Wm. Yagie, Wm. Yagie Company, Limited, Pittsburgh, Pa.
F. D. Stevens, Walker & Pratt Mfg. Company, Boston, Mass.
A. J. Miller, Jr., Whitehead Bros. Company, Providence, R. I.
Arthur E. Shields, Shields Foundry Company, Mansfield, Mass.
Wm. W. Lobdell, Lobdell Car Wheel Company, Wilmington, Del.
Albert J. Meyer, Abram Cox Stove Company, Philadelphia, Pa.
Jacob Thompson, A. Thompson & Co., Philadelphia, Pa.
E. B. Pierce, Wheeler's Foundry Company, Worcester, Mass.
Henry Wright, Buckeye Malleable Iron Company, Columbus, Ohio.
George B. Buckingham, Arcade Malleable Iron Company, Worcester, Mass.
F. H. Zimmons and F. H. Zimmons, Jr., Union Foundry & Machine Company, Pittsburgh, Pa.
Thomas J. Rankin, Abram Cox Stove Company, Philadelphia, Pa.
J. S. McCormick, J. S. McCormick Company, Pittsburgh, Pa.
E. G. Whitney, Kidder Press Company, Dover, N. H.
E. B. Cook, Warwick Iron & Steel Company, Pottstown, Pa.
A. L. Nash, Dalton Nash Company, New York, N. Y.
W. S. White, J. S. White Company, Pawtucket, R. I.
Thomas D. West, Thos. D. West Foundry Company, Sharpsville, Pa.
Robert P. Cunningham, Deane Steam Pump Company, Holyoke, Mass.
G. A. Reed, Reed & Son., Gloucester, Mass.

TUESDAY MORNING SESSION.

The opening session was held on Tuesday morning, 17th inst. The secretary, Dr. Richard Moldenke, called the assemblage to order and announced that owing to the death of the president, J. G. Sadlier of Springfield, Ohio, the vice-president for New York and New Jersey, Walter F. Prince of Elizabethport, N. J., had been selected to fill the chair. Mr. Prince accepted the position with suitable remarks and introduced Henry A. Carpenter of Providence, R. I., president of the New England Foundrymen's Association, who welcomed the convention to Boston, stated that such efforts had been made to prepare entertainment for the visitors that if they did not go away with pleasant recollections it would be their own fault, spoke of the great value of such meetings in awaking interest in modern methods and hoped that the sessions to be held would prove instructive, enjoyable and beneficial. James H. Doyle, chairman of the Boston Board of Aldermen, officially welcomed the convention to Boston. Prof. C. F. Park of the Institute of Technology delivered an address of welcome in behalf of that institution and presented the use of the hall for the purposes of the convention. Stating that scientific education and practice must go hand in hand, he invited the members of the convention to visit the laboratories of the institute and inspect the facilities thus provided for imparting technical instruction. Ex-President C. S. Bell of Hillsborough, Ohio, speaking for the association, responded in eloquent language to the various addresses of welcome.

Secretary Moldenke read his annual report, of which the following is an abstract:

Report of the Secretary.

Another prosperous year has been given to us wherein to consolidate our resources, improve our plants and plan new developments in our increasing industry. The difficulties encountered lay in getting material rather than orders, all foundries abreast of the times making money. As the foundry industry consumed over 3,500,000 tons of pig iron, besides the proportionate amount of scrap, in the last fiscal year, and iron has averaged at least $15 a ton during that time, there is little wonder that with such enormous sums involved and these distributed into every nook and corner of this great land, the foundry industry is looked upon as a good barometer of the general business of the nation. With indications pointing to a still further advance in pig iron through increased consumption, many of our foundrymen are contracting for next year's delivery, and fortunate are those who have covered their this year's requirements at fair prices.

Our association seems to have experienced a similar change to a more prosperous condition, the latter half of the fiscal year just closed indicating an interest so marked that our members have every reason to be proud of the standing being acquired by it in one of the numerous lines of the industrial development of the world. There is an unusual amount of interest manifested in the study of cast iron, those industries into which large quantities of castings enter making close inquiries about their quality. The molder's art is beginning to be recognized as one which is most intricate and important, and there is a general inclination to place the molder himself upon the plane of a highly skilled workman who should not waste his time and his employer's money by performing unskilled labor.

Perhaps the close economies effected in the steel industry by utilizing the highest skill obtainable, or in other words, by paying for brains well directed, has left an impress on our own methods, for we also are beginning to demand the greatest production at the lowest cost, and are furnishing the best of facilities and paying the best of wages to do it.

There have been many changes in the membership of our association. Death has reaped a harvest, and removed many men most useful to our industry. The sad and tragic death of our worthy president, John J. Sadlier, was, perhaps, that least expected by us all. Hale and hearty while at our last convention, full of the fire of life while discussing the molder of the future upon the floor of the house, honored by founder and molder alike, he fell by the bullet of one of the very artisans he had helped to make.

In spite of the deaths, resignations, removals from the list and consolidations, we can record a net increase of 17 names, making the total membership 314. The tide turned during the last few months of the year just closed, and was aided by the addition of members from England, Scotland, Wales, Germany and Holland. Inquiries from Denmark, Russia, South Africa, and even India, may result in extending the usefulness of our association into those fields, and go to show that the world is taking note of American foundry practice, and is presumably wondering how we can afford to be so liberal with our information.

During his recent travels in Europe your secretary met with many of the foremost directors of industries, State officials, financiers and scientists, and nearly every one exhibited the liveliest interest in American methods or procedure, in our national resources and transportation facilities, and in our declared national policy. There were a few who affected to look down upon us with the scorn bred of centuries of industrial security, but who will none the less live to rave at the "American peril" when we cut into their holdings. Everywhere cast iron was the topic of general interest. Your secretary, whom you so kindly accredited to represent our association abroad, found it well known everywhere through its work, even if he did have to translate its name into several languages to enable the inquirers to watch specially for the proceedings in the technical press of their respective countries.

At the Buda-Pest congress of the International Association for Testing Materials the study of cast iron was ably urged by the only three American members present, and each of the three is directly interested in a foundry. The result was the making of tests on cast iron a special feature of the work mapped out, and much will doubtless be learned by the associated effort of the many nations interested. Our own American Association for Testing Materials, of which we are members, in its convention last week devoted one entire session to reports on, and the discussion of cast iron. The committee appointed by them to codify the matter of specifications will doubtless utilize those adopted by us last year to the best possible advantage.

On looking over the work of the association for the past year, you will have noticed that it was very much in the line of progress. The fact that we are nearly all foundrymen, and therefore with interests to conserve, has not prevented us from urging better methods to obtain better results. We are more interested in furnishing our customers with the best of castings than they may be willing to give us credit for, as we have to hold a field which the requirements of the times is making more and more difficult to care for. Our national economy will not long tolerate the production of great weights of inferior cast iron when comparatively light steel castings will do at least as well. The watchword is now to put the best of material into the best made castings, in great quantities and at extremely low costs. There is little wonder that the excellent papers on the molding machine now being published in our *Journal* are attracting wide attention. We hope they may be extended a long time yet, and be made most exhaustive, so that a foundation may be laid upon which even future generations may build. We have also to thank the technical press, as well as the great engineering associations, for the interest taken in our efforts for foundry betterment, in which they have given us substantial aid.

With no bills outstanding, the association is free from debt, and with as bright a future ahead as the members wish to make it by the extent of their substantial support. This excellent showing is, however, in a great measure due to the work of the Standardizing Bureau, the profits of which went into the treasury. Our special thanks are due Mr. West for the disinterested manner in which he has devoted time and money in the furtherance of a work now everywhere recognized as of great value to the foundry and the steel industries.

There are two further subjects to which our association might do well to give a substantial encouragement.

The study of the electrical properties of cast iron, in conjunction with Purdue University, as reported to you last year, was not acted upon further on account of lack of funds. Then American support is most urgently needed by the Sidero-Chemical Laboratory established in Switzerland, for international research in the very lines which will be of the utmost value for the standardization of methods of the laboratory. Should we get into the position that something can be done for these matters a substantial impetus for foundry progress will result in at least those immediate lines.

The report of the treasurer, Thomas D. West of Sharpsville, Pa., was read, showing receipts of $2353.98 and expenditures of $2352.61, leaving a balance on hand of $1.37.

Report of Committee on Standardizing Bureau.

Mr. West, representing a committee consisting of himself, Dr. Richard Moldenke of New York, James Scott of Pittsburgh, Phiietus W. Gates of Chicago and E. H. Putnam of Moline, Ill., read the report of the Standardizing Bureau, which stated that the sales of the association's standardized drillings continue as large as during the last three years and that the work is becoming of constantly greater importance. Not only are the blast furnaces and laboratories dealing with cast iron utilizing these drillings for their daily standards, but where disputes arise concerning the accuracy of individual work these standards are sent for to settle them. Thus the purpose for which the bureau was originally created has been fully accomplished, and the iron industry has acquired a very material help toward a better basis for the daily routine. Through the efforts of a member of the committee a substantial reduction in the cost of analytical work has been secured for the trade from two reliable laboratories in Pittsburgh and Cleveland.

The same committee also presented a report on standard methods of sampling iron. In his memorial to the association urging standard methods of sampling A. L. Colby emphasized the necessity of this action in order to avoid unnecessary complications between furnacemen and founder. The committee, after studying the matter, came to the conclusion that inasmuch as the furnaceman has the burden of the trouble to bear in case of rejection, it is in his interest to see that the various carloads of iron he sells are sampled by the purchaser in the fairest manner possible. The committee did not think it wise to specify the manner in which a furnaceman should sample his casts, interesting as it may be, for foundrymen are solely concerned with the particular carload which comes to them, and have no means of knowing how many furnace casts may be mixed in it accidentally or otherwise.

They recommend the following specifications to be adopted provisionally only, in order to give the furnaces an opportunity to give the association the benefit of their experiences during the coming year:

1. Eight pigs shall be selected from each carload of iron, two each from the upper and the lower portion of each half of the car. The eight pigs, being of the average size and weight of the shipment, will be fairly representative of the whole.

2. These pigs are broken in such a way that a piece of convenient length showing a clean fracture is available. The eight pieces are placed in a suitable box, and this duly marked with the car initial and number.

3. The freshly fractured and clean face of each piece is now drilled in two places half way between the center and edge, a drill of large diameter being used. From the heap of drillings surrounding the drill enough is taken for the purpose wanted, and placed on a sheet of glazed paper. The drillings are thoroughly mixed and preserved. In case of dirty or excessively sandy iron the magnet should be used on the sample before analysis, for additional safety.

4. Sufficient drillings shall be made to afford material for exchange with the furnace laboratory, as well as a possible subsequent checking with the American Foundrymen's Association standards.

5. The allowable variation from specified compositions shall be as follows: For silicon, 10 points either way (plus or minus 0.10 per cent.). For sulphur, not over 0.005 per cent. above the determinations, in case of a dispute to be made by the oxidation method. For manganese, 10 points either way. For phosphorus, not over 0.05 per cent. above for all irons running over 0.30 per cent. Below this the variation shall be a matter of special agreement. For total carbon, if specified at all, the variation shall be a matter of special agreement.

6. The variation of the check determinations between foundry and furnace, as well as with the American Foundrymen's Association standards, shall not be over the following: Silicon, 0.05 per cent.; manganese, 0.05 per cent.; sulphur, 0.005 per cent.; phosphorus, 0.02 per cent., and total carbon, 0.05 per cent.

The same committee submitted a progress report on standard methods of determining the constituents of cast iron, stating that a large number of circular and personal letters have been sent to professional men, requesting memoranda upon their methods, with a view of selecting standards therefrom. These reports will be duly published in the *Journal* (omitting all names), in order that all the information may be properly grouped for critical study by the experts who will be asked to select the methods best adapted to foundry requirements. In the meantime the committee solicit further communications from active iron chemists in order to have as wide an experience to draw from as possible.

These reports were all received and unanimously adopted without discussion.

Reports of Other Committees.

Mr. West, representing a committee composed of himself and Dr. Moldenke, read a report on the grading of pig iron by analysis, stating that it was found that, with the exception of the jobbing founder, practically every one else is now specifying the composition of the iron he buys, or else is particular to find out what he gets. For these founders, who consume about three-fourths of the pig iron sold to foundries, the labors of the committee would be superfluous. The jobbers, however, will continue to buy their No. 1 and No. 2 irons by fracture, irrespective of what they really get, will have their little troubles and get over them as heretofore, and receive the leavings of the founder who buys by chemical specification and sees that he gets what he wants. Since the feeling in the association seems to be in the direction of exact methods of buying iron, and as the majority of founders not members of the association do not appear to be interested, the committee suggested that they be discharged. C. S. Bell defended the practice pursued by the jobbing founder, who is required to use many grades and brands of iron to meet the wants of his numerous customers, and is therefore not in a favorable position to buy by analysis. The committee were discharged with thanks.

The committee on the foundry trade school, consisting of Messrs. West, Putnam and Moldenke, reported that no action had been taken, but urged the necessity of such an institution and the desirability of a decision by the association whether the work of establishing one should be conducted under their auspices or be left to outside effort. Ex-President J. S. Seaman of Pittsburgh stated that the Carnegie Institute in that city will undoubtedly have a foundry department, and suggested that it would probably meet this want. A. W. Slocum of Pittsburgh moved that the committee be discharged with thanks and that another committee be appointed to co-operate with the Pittsburgh Foundrymen's Association in conferring with the management of the Carnegie Institute in the endeavor to secure the establishment of a department to give instruction in foundry practice. The motion was adopted.

J. S. Seaman of Pittsburgh reported that the Auditing Committee had found the accounts of the secretary and treasurer correct, but having ascertained that the secretary had donated his salary to the association, moved that the Executive Committee be instructed to devise ways and means to raise the necessary funds to reimburse him. The motion was adopted.

The standard specifications for steel castings adopted by the American Association for Testing Materials were laid before the convention for information and printed copies were distributed.

Insuring Patterns.

Frederick Colin of South Bethlehem, Pa., read a carefully prepared paper relative to the method of insuring patterns, in which he discussed the trouble experienced in appraising the value of patterns when destroyed by fire. He recommended the appointment of a committee to meet with a representative body of underwriters for the purpose of arriving at an equitable method of ap-

praising this class of property. A motion was adopted for the appointment of a committee.

Better Method Desired for Valuing Pig Iron.

Dr. Moldenke submitted a memorial in behalf of a better method of valuing pig iron for foundry purposes than that in vogue, as it is well known that pig irons of the same grade and presumably the same composition, coming from different furnaces, when remelted under the same conditions, show entirely different strengths, yet are sold on practically the same terms. Some standard method seems desirable by which a poor iron may be culled out or sold for its intrinsic value only. He suggested that the Standardizing Bureau of the association be instructed to devise methods to enable the value of pig irons to be better judged. They should be tested by being put through a cupola under the fairest conditions possible, and test bars made according to the association's standards. Analyses and physical tests can then be made which would give the founder the information he desires. A motion was adopted instructing the Committee on Standardizing Bureau to report a standard method for this purpose at the next convention.

TUESDAY AFTERNOON AND EVENING.

No further business sessions were held, the remainder of the day being abandoned to pleasure. It being the anniversary of the battle of Bunker Hill, a great military and civic parade in the afternoon interested many. Others witnessed a ball game. A large delegation visited numerous places of historic interest in the old part of the city. In the evening those attending the convention formed a mammoth theater party. All this was done under the direction of the local entertainment committee, who provided tickets, guides and all other requisites. This committee consisted of the members of the New England Founders' Entertainment Association, under the direction of Henry A. Carpenter of A. Carpenter & Sons Foundry Company, president; John Magee of Magee Furnace Company, treasurer, and Fred F. Stockwell of Barbour-Stockwell Company, secretary, who had as associates on their Executive Committee the following: B. M. Shaw, Walker & Pratt Mfg. Company; Geo. H. Lincoln, Geo. H. Lincoln & Co.; F. B. Farnsworth, McLagon Foundry Company; Wm. Doherty, Doherty Bros.; Theodore Colvin, Colvin Foundry Company; Geo. B. Buckingham, Arcade Malleable Iron Works; Geo. H. Gibby, Condor Iron Foundry Company; L. S. Brown, Springfield Facing Company, and J. F. Lanigan, Davis Foundry Company.

This committee placed in everybody's hands a most convenient programme of the convention, which was at the same time a guide to points of interest in and about Boston. The entertainment of their visitors was carefully looked after in all details, including elaborate arrangements for the benefit of the ladies.

Notes.

The Newport Sand Bank Company, Newport, Ky., made a fine exhibit of castings molded in sand mined by them. These consisted of bronze and brass castings, such as valves, builders' hardware and art work.

The S. Obermayer Company, Cincinnati and Chicago, distributed ingenious fans, having a metal wheel rotated by thumb pressure, designed as a summer convenience and greatly appreciated by the ladies. They also exhibited a very intricate one-piece brass casting made by Daniel Galvin, Paducah, Ky., consisting of an open structure showing a well curbing representing the old oaken bucket, and having in the top a loose ball cast in a frame. The molder made his own patterns.

Henry E. Pridmore, Chicago, distributed glass paper weights and neat memorandum books.

L. S. Brown, Springfield Facing Company, Springfield, Mass., distributed neat leather pocketbooks.

J. D. Smith Foundry Supply Company, Cleveland, Ohio, distributed cigar cases.

A telegraphic report of Wednesday's proceedings will be found elsewhere.

The St. Louis Enameling Company of Ninth and Monroe streets, St. Louis, want bids on their malleables for the coming season.

The Richmond Company.

The Richmond Company is the name of the corporation just chartered at Norwich, Conn., with an authorized capital of $500,000, who have purchased the entire business, including patterns, machinery, tools, trademarks, good will, &c., of the Richmond Stove Company of that place, and will continue the manufacture of stoves, ranges, steam and hot water boilers, &c., under the name of Richmond, as heretofore. We understand that the expanding business of the old company required more capital than could be provided under their old charter, and it was therefore deemed expedient and necessary to organize a new company with a larger authorized capital to take over and carry on the business.

The officers of the Richmond Company are: President, W. S. McMullen; vice-president, William N. Blackstone; secretary and treasurer, T. G. Haywood. The directors of the company are: William N. Blackstone, A. K. Chase, William B. Young, Charles Bard, Frances J. Leavens, Frank A. Mitchell and W. S. McMullen.

From the above it will be seen that the same directors and officers of the old Richmond Stove Company will have in charge the management of the affairs of the new concern.

The company have just completed an addition to their foundry, 103 x 70 feet in size, and have in process of construction a new foundry building, 150 x 150 feet; also a warehouse of the same dimensions.

PERSONAL.

Walter R. Woodford, formerly of the Baltimore & Ohio Railroad, has assumed his new position of second vice-president of the Pitsburgh Coal Company, at Pittsburgh.

Edmund C. Converse, one of the directors of the United States Steel Corporation, has been elected a director of the International Steam Pump Company.

William Bingham, formerly superintendent of Charlotte furnace, at Scottdale, Pa., owned by Corrigan McKinney & Co. of Cleveland, has resigned and J. S. McKesson has succeeded him.

James W. Brown, president of the Colonial Steel Company, at Pittsburgh, has been elected a director of the Pennsylvania Trust Company in that city.

John R. McGinley of Pittsburgh has been elected a member of the Executive Committee of the Pneumatic Tool Company.

James B. Laughlin of Jones & Laughlins, Limited, of Pittsburgh, has been elected a trustee of Princeton University, at Princeton, N. J.

M. E. Johnson, formerly assistant manager fence department of the American Steel & Wire Company, New York office, has been elected general manager of the United States Wire & Nail Company, at Pittsburgh, Pa.

F. W. Wurster, the manufacturer of bar iron and axles, of Brooklyn, and formerly mayor of that city, was injured in an automobile accident last week.

Benjamin Talbot, the inventor of the continuous open hearth process which bears his name, has so far recevered from an attack of typhoid fever that he can sail for home on Friday. He has been at Atlantic City for some time.

Charles W. Hunt, secretary of the American Society of Civil Engineers, has sailed for Scotland for a prolonged visit.

R. F. Howe of the Deering Harvester Company has been elected a director of the South Chicago Furnace Company, in the place of D. M. Cummings.

T. B. DeArmitt has severed his connection with the Empire Coal Company, and will engage in the coal business at Pittsburgh.

George G. McMurtry, president of the American Sheet Steel Company, has gone to Europe and taken with him three ministers from Vandergrift, Pa., as his guests.

S. T. Wellman of the Wellman-Seaver-Morgan Engineering Company expects to sail for Europe early in July.

Frank A. Lapham has resigned his position as general sales agent of the Tennessee Coal, Iron & Railway Company to accept a position as general sales agent of the Lackawanna Steel Company, with headquarters at 100 Broadway, New York. He assumes his new duties on July 1.

Frank A. Burr, who has been connected with the New York sales office of the Pennsylvania Steel Company, has resigned to accept the post as general sales agent of the Tennessee Coal, Iron & Railway Company at New York.

W. H. Hearn of Matthew Addy & Co., pig iron merchants, Cincinnati, Ohio, has returned from a brief stay in England.

Prof. Charles L. Griffin of the Pennsylvania State College has been appointed professor of mechanical engineering at the new College of Applied Science of Syracuse University.

The Foundrymen's Association.

(By Telegraph.)

The early hours of Wednesday morning were spent by many of the members in visiting the laboratories of the Institute of Technology and witnessing tests of materials. They were greatly impressed by the completeness of the apparatus. The business session opened with numerous new faces in evidence, quite an augmentation in the attendance having been made by fresh arrivals. The president announced the appointment of the following committees:

Nomination of Officers: Messrs. Yagle, Colvin, Golden, Wolff and Flagg.

Auditing: Messrs. Brown, Seaman and Yagle.

Trade School: Messrs. Seaman, Yagle, Zimmer and West.

Insuring Patterns: Mr. Colvin, with two others to be named by himself.

David Reid of Biddeford, Maine, read his paper, "Some Methods of Increasing Foundry Production." Replying to questions by Stanley G. Flagg, Jr., of Philadelphia, Mr. Reid stated that the shop had been run in warm weather. The molders are paid by the day and the shop can be called a union shop.

Hugh McPhee of Bridgeport, Conn., read his paper on "Shop Conditions," in which he pleads for better arrangements for the comfort of molders, so that they may be placed on an equality with other mechanics. This elicited considerable discussion, principally in the direction of bringing out points with regard to increasing production through the improvement of molders' surroundings and convenience.

R. P. Cunningham, Holyoke, Mass., read his paper on "Foundry Costs," dwelling on the importance of watching details which interfere with the continuous work of molders, such as an inadequate suply of tools, &c. Other practical points were covered which brought out hearty expressions of appreciation.

Edward B. Golmour, Milwaukee, Wis., read his paper on "Cores and Core Arbors." Lack of time prevented any discussion.

James A. Murphy, Erie, Pa., read his paper on "Shop Tools and Rig." The secretary read a short paper by Prof. R. H. Richards, Boston, on "The Preparation of Young Men for the Foundry Business." The other papers scheduled for this session were deferred until the Thursday meeting. The afternoon was devoted to a carriage drive through the park system and to the stove foundry of the Walker & Pratt Mfg. Company, Watertown.

The Portsmouth Steel Company.—PITTSBURGH, PA., June 18, 1902.—The Portsmouth Steel Company is the title of the new company recently organized, and who bought the Portsmouth works of the Crucible Steel Company of America, at Portsmouth, Ohio. The Portsmouth plant is owned by the Whitaker Iron Company and Laughlin Nail Company, both of Wheeling, W. Va. The product of the plant will be open hearth billets, which will be sold in the open market. The officers of the Portsmouth Steel Company are W. L. Glessner, president; N. E. Whitaker, vice-president, and B. F. Vincent, secretary.

The Worcester Machinists' Strike.

WORCESTER, MASS., June 16, 1902.—The past few days have disappointed the Worcester machine tool builders, for the strike of machinists has not come so nearly to an end as had been confidently expected. The strikers at the shops of the Prentice Bros. Company, who promised Tuesday to return to work the next morning, did not live up to their agreement, owing to the tremendous pressure brought to bear upon them by their leaders, who had themselves been strengthened by the arrival from the West of officers of their national association. A few of the strikers are at work again.

On the other hand the shops have been daily adding to their forces from outside the city. The increase of the shop gangs has been gradual, but the aggregate of new men is considerable, especially in the face of a season of duller business, caused partly by the strike and partly in the natural order of things, July and August being quiet months in Worcester machine shops. Quick developments are expected by the manufacturers, but nothing is certain. The strikers are proclaiming that the Metal Trades Association is employing Pinkerton detectives in an effort to procure proof that the strikers are actually intimidating men by threats of violence. This is denied absolutely by the members of the association, who characterize the whole story as a fake.

J. N.

The Molders at Pittsburgh.—PITTSBURGH, PA., June 18, 1902.—The threatened strike of the molders in the Pittsburgh district has been averted. The National Founders' Association has given the men an advance of about 6.66 per cent., with a minimum rate of $3 per day. The men asked for an advance of 10 per cent and a minimum rate of $3.30 per day, but their demand was compromised. The new scale of wages is in effect for one year from July 1 next.

Theodore Geissmann, 1325 Monadnock Block, Chicago, has been appointed agent for the Todd-Oberchain Company, New Albany, Ind., makers of Chain; for Paul S. Reeves & Son, Philadelphia, manufacturers of Brass, Phosphor Bronze and Special Composition Metals, and for Arthur C. Harvey Company, Boston, Mass., dealers in Swedish and Norwegian Irons. Mr. Geissmann was formerly assistant superintendent for the F. C. Austin Mfg. Company.

The organization of the Western Steel Car & Foundry Company, an identified interest of the Pressed Steel Car Company of Pittsburgh, has been completed by the election of the following officers: A. C. McCord, president; D. W. McCord, vice-president; A. H. Larkin, secretary; P. G. Jenks, treasurer, and S. E. Moore, auditor.

The structural iron work has been started on the new train shed to be built by the Pennsylvania Railroad at Union Station, Pittsburgh. The train shed will be 500 feet long and 88 feet high at the center of the arch. It will cover 14 passenger tracks and will be one of the largest train sheds in the country. From 2000 to 3000 tons of structural steel will be used in the building of the shed.

The Newburgh wire rod mill of the American Steel & Wire Company at Cleveland is to shut down for two months.

MANUFACTURING.

Iron and Steel.

The Sylvan mill of the Republic Iron & Steel Company at Moline, Ill., will be remodeled at a cost of about $65,000 and made one of the largest producing plants of the combination; new equipment will be installed for the handling of steel. The two old mills, Nos. 8 and 16, with the furnaces, will be torn out entirely and new mills with continuous heating furnaces installed. All types of light rolled steel will be turned out. The plant will probably employ about 300 men when in operation.

The Keystone Rolling Mill Company, Limited, Pittsburgh, Pa., a limited partnership, have been dissolved by mutual consent and by the expiration of the term of association. The liquidating trustees are James McCutcheon, John M. Kennedy and J. B. Orr. The plant was sold some months ago to the Fort Pitt Iron & Steel Company of Pittsburgh, who are now operating it in the manufacture of muck bar and iron skelp.

The Atlantic Furnace, at New Castle, Pa., of the Republic Iron & Steel Company was blown in on Saturday, June 7, at 3 o'clock, after having been relined. A gas explosion occurred at 4.30 the same day which blew out the bells on the top and bottom of the down corner, broke all explosion doors under the platform on top and blew out 50 feet of the fire brick arch over the gas flue in front of the boilers. No one was injured. Temporary repairs were made and the furnace again started at 10 o'clock Sunday night.

Rogers Copper & Iron Company of Aberdeen, S. D., have been organized with a capital of $1,000,000. The incorporators are C. H. Shuler, C. S. Hoskins, George T. Smith, C. C. Gleckler, J. A. Ewing and W. J. Stark.

Employees of the Republic Iron & Steel Company of Chicago have chosen Charles E. Graves, Ralph P. Zint and P. G. Maitland as a committee of trustees for the stock of the company to be purchased by the employees in accordance with their profit sharing plan.

A large addition is being built to the plant of the S. Severance Mfg. Company, at Glassport, Pa., manufacturers of spikes and rivets.

The New Castle Forge & Bolt Company, who erected a new plant in New Castle, Pa., in the early part of this year for the manufacture of nuts, bolts and rivets, will add an addition 64 feet long and 60 feet wide, to be used for storage purposes. This concern are crowded with orders and will run their plant double turn.

The fire at the plant of the Oliver Iron & Steel Company, South Side, Pittsburgh, June 10, was entirely confined to one building and will in no way affect their general business nor cause any shut down in the mills or bolt and nut departments. The loss will be less than $10,000. The men thrown out of work will be given employment in other departments of the plant and the damaged building will be immediately repaired. In the electrical supply department, which was damaged, the company had a good stock on hand to supply immediate orders.

The Reading Iron Company of Reading and the Susquehanna Iron & Steel Company of Columbia, Pa., have increased the wages of the puddlers to $4.50 per ton. This increase ends the strike of the puddlers at the mill of the latter company.

The Fannie Furnace Company of West Middlesex, Pa., have granted a 10 per cent. advance in wages, with a reduction of time from ten to nine hours.

The increasing business of the American Steel & Wire plant, it is claimed, has made it necessary to enlarge their wire drawing factories of the east plant at De Kalb, Ill. The officials were in De Kalb a short time ago and decided to make a $75,000 improvement on the building. The new building will be commenced as soon as the material can be got upon the ground. The company contemplate constructing a shipping channel on the lake front at Waukegan, leading from the harbor to their big factory, permitting the direct loading and unloading of large ships.

The first annual meeting of the stockholders of the Kokomo Steel & Wire Company, Kokomo, Ind., was held on June 6. The officers for the ensuing year were elected as follows: President, A. A. Charles; vice-president, Richard Ruddell; secretary, J. E. Fredrick; treasurer, Harry Ward. The directors of the company are as follows: Richard Ruddell, A. A. Charles, J. A. Krautz, G. W. Charles, A. V. Conradt, J. E. Fredrick, Harry Ward, J. O. Henderson and F. E. Wickenhiser. This company are building a large plant whose cost is estimated at $2,000,000. The company expect to be in full operation in 60 days.

The Smith Mfg. Company, Waynesboro, Pa., are working to the fullest capacity, and for four months of this year have run overtime. The work in hand embraces medium sized highway bridges, of which they built 72 last year; steel fence, fire escapes, structural iron work, ice cans, &c. Within a short time they have filled contracts aggregating 10,000 ice cans. They have a contract for a $3000 fence for Boston.

The puddle and finishing mills of the Norristown Iron Company, at Norristown, Pa., will be removed to Lebanon as soon as possible. H. H. Light, president and general manager, advises us that the new plant will be located near that of the American Iron & Steel Mfg. Company, and will be 117 x 360 feet, with a daily capacity of 100 tons. About 300 men will be employed.

The Empire Iron & Steel Company, organized some time since, are building a plant at Niles, Ohio, consisting of six sheet mills, bar mill and squeezers, with scrap and puddling furnaces, waste heat boilers, steel buildings, trestle tracks for unloading, cranes, shears, machine shop and all small machines to operate by electricity. This plant will have all labor saving appliances known to good rolling mill practice, and is being built for service and economical cost of production. The engines are of the Allis make, the firing boilers are made by the Stirling Company, and the waste heat boilers are of the Cahall type. Everything about the plant is of the same standard of excellence. All contracts have been let for several months, and the mill will likely be in operation in August.

It is probable the Canonsburg works of the American Tin Plate Company, at Canonsburg, Pa., will be closed down about July 1 and that the plant will not again be operated. It is a five-mill plant, and the equipment will likely be removed to some other of the more important works of the American Tin Plate Company.

It is stated that an independent company are being organized to erect an open hearth steel plant and sheet mills at Lisbon, Ohio.

Work is being pushed rapidly on the new 10-mill tin plate plant being built by the McKeesport Mfg. Company, at Port Vue, McKeesport, Pa. The plant is expected to be ready for making tin plate in November, and is being so arranged that another 10 mills can be installed at any time.

The Forter-Miller Engineering Company, engineers and contractors, Westinghouse Building, Pittsburgh, have been awarded a contract for an open hearth furnace plant for the C. Pardee Works, Perth Amboy, N. J. The furnaces are basic, of 30 tons capacity each, and will be of the most modern construction and design. They will be equipped with the Forter water seal gas valve. The gas for these furnaces will be furnished by the Forter water seal gas producers. The Forter-Miller Engineering Company have also recently secured a contract from the Latrobe Steel Company, Latrobe, Pa., to change all their gas producers to water sealed type.

It is stated that two modern finishing mills are to be added to the Warren and Girard works of the American Steel Hoop Company, at Warren and Girard, Ohio.

The New Process Steel Company are being organized at Homestead, Pa., and it is claimed the concern will build a plant in the Pittsburgh district for the manufacture of steel under a patented process. It is also stated that several employees of the Homestead Steel Works are connected with the new venture.

Three or four of the furnaces in the Ironton, Ohio, district have been compelled to bank down on account of the coal miners' strike in the bituminous coal fields in West Virginia.

General Machinery.

We are advised that the Standard Roller Bearing Company, Philadelphia, Pa., have purchased the entire business, patents and good will of the Grant Roller Bearing Axle & Wheel Company of Springfield, Ohio, and are prepared to fill all orders for roller bearing axles as made by that concern. These goods have become extremely popular among builders and users of carriages, wagons and automobiles, and added to the ball, roller and antifriction bearings already made by the Standard Roller Bearing Company, will make their line very extensive and complete.

The Bicycle Garden Plow Company of Jackson, Ohio, have recently been incorporated and will manufacture garden plows and cultivators. The concern are in the market for considerable iron working machinery.

The Ruth Iron Works of Duluth have been organized with a capital of $15,000. The incorporators are Sarah L. McNulty, R. F. Grant and J. W. Sullivan of Duluth.

The Philadelphia Drying Machine Company, Philadelphia, Pa., are erecting an addition, 40 x 100 feet, to their plant.

S. E. Walling, Whatcom, Wash., is starting up a machine shop, the principal product of which will be a planer chuck of his own invention.

The Buffalo Forge Company of Buffalo, N. Y., intend to establish a plant in Canada to be operated by a subsidiary company. No details as yet are available.

The Fore River Ship & Engine Company, Quincy, Mass., have installed a new 24-inch boring mill and a 72-inch planer. The seven-masted schooner "Thomas W. Lawson" is nearly ready for launching. The parts of the new 75-ton gantry crane are being assembled along the fitting out basin at the yard, and the work on the concrete dock that will support it is being hurried to completion so that everything may be in readiness to bring the cruiser "Des Moines" alongside as soon as she has been put over.

The Talladega Company, Talladega, Ala., have been granted a franchise to operate an electric railway and light system. The company will erect a power plant at Jackson's Shoals.

Catalogues, prices, &c., on machinery for the manufacture of

sash, doors and blinds are desired by Carneal & Davis, Richmond, Va., dealers in builders' supplies, who wish to purchase such machinery for their new mill.

A complete equipment of clay working machinery is required by the Weir Pottery Company of Monmouth, Ill., who will at once begin the rebuilding of their plant, which was recently destroyed by fire, adding fully 50 per cent. to the capacity.

The Northwestern Scrap Iron & Machinery Company, Chicago, have been organized with a capital of $5000 for the purpose of dealing in iron and machinery. The incorporators are M. Dry, A. Cohn and Joseph V. Crane.

The D. E. Whiton Machine Company of New London, Conn., are adding about 12,000 square feet of floor space to the main building and have plans prepared for the erection of a foundry and cleaning room of about 6500 square feet. No new machinery will be purchased until the additions are completed, as it is the intention of the company to rearrange the several departments.

The R. L. Smith Machine Works, Lincoln, Neb., owing to the increase in their machinery supply business, have leased the repair department and are in a better position than ever before to fill orders for machinery, supplies and repairs.

To provide the necessary facilities for taking care of their veneer machinery business, the Merritt Mfg. Company of Lockport, N. Y., will erect a new plant, equipment for which is on hand. The shop will be operated by electricity.

C. L. Grimes has sold his interest in the Wichita Mfg. Company to his former partners, J. F. Warren and Henry Anthony, who will continue the business at Wichita, Kan., under the old name of the Wichita Mfg. Company. Mr. Grimes has accepted a position as superintendent of the W. W. Whitehead Company, manufacturers of engines and boilers at Davenport, Iowa.

The Landis Tool Company, Waynesboro, Pa., state that the present year so far has been the best in their business history. They are now making an addition to their main building of 110 x 40 feet, to be used as stock room and paint shop. They have recently shipped grinding machines to the following concerns. The Allis-Chalmers Company, Milwaukee, Wis.; Central Railroad of New Jersey, Elizabethport, N. J.; Bement-Miles Company, Philadelphia, Pa.; Pratt & Whitney Company, Hartford, Conn.; Morse Twist Drill Company, New Bedford, Mass.; Cincinnati Milling Machine Company, Cincinnati, Ohio; Ward & Gay, Athol, Mass.; Charles Angell, Providence, R. I., and a considerable number to England and Continental Europe.

The William Tod Company, engineers, founders and machinists, Youngstown, Ohio, have decided to make some material enlargements to their plant. Among the additions to be made will be a new erecting shop, 70 feet crane span, and 70 feet high by 200 feet long, provided with two 50-ton cranes, with 10-ton auxiliary hoist; an additional machine shop, 50 feet span, 50 feet high by 200 feet long, which will also be equipped with proper crane capacity; a forge shop, 30 x 150 feet, and a new boiler plant. The concern are installing a large number of iron working tools and their capacity for the building of engines and rolling mill equipment will be very much enlarged.

The Peerless Electrical Company have been organized at Warren, Ohio, and will take up the manufacture of direct and alternating current desk and ceiling fan motors and power motors, transformers and other electrical machinery. They expect to be in position to do business shortly after August 1, or about that time.

A charter has been issued to the Federal Machine Company of Allegheny, Pa., with a capital of $15,000.

The J. L. Mott Iron Works of New York City are preparing plans for a new plant, to be located at Trenton, N. J.

Boilers, Engines, &c.

The recently organized Amarillo Light & Water Company, Amarillo, Texas, are erecting an electric light plant, to be equipped with two 45-kw. General Electric 220-volt dynamos with 12 x 13 Case automatic high speed engine and two 125 horse-power Morrison internal fired boilers, and water works system equipped with three Cook deep well pumps. The officers are Jno. W. Porter, president; H. B. Jones, vice-president and general manager, and E. L. Dohany, Jr., secretary and treasurer.

Charles H. Warner, Baiting Hollow, N. Y., is in the market for several gasoline engines.

The Weir Pottery Company, Monmouth, Ill., are in the market for a 200 horse-power engine.

The Du Bois Iron Works, Du Bois, Pa., are building a large band saw mill, complete except the engine, for a point in the State of Maryland and are also manufacturing gas engines from 2½ to 1000 horse-power, making on an average an engine every two days. In the boiler shop there are now being built eight 250 horse-power water tube boilers.

The Apex Equipment Company, 11 Broadway, New York City, have received an order from the El Paso & Southwestern Railroad for two 18 x 26 50-ton freight engines. The Apex Company have just delivered to the same company ten freight cars of 60,000 pounds capacity each.

Engine sales of the Allis-Chalmers Company, Chicago, Ill., for the month of May include one 18 x 36 inch and one 22 x 48 inch 1890 frame Reynolds Corliss engine, to the Wolf River Paper Company, Shawano, Wis.; 26 x 48 inch 1890 frame Reynolds Corliss engine to the Surry Lumber Company, Baltimore, Md.; 16 x 42 inch girder frame Reynolds Corliss engine to S. P. Brown & Co., Albany, Ga.; 22 x 42 inch 1890 frame Reynolds Corliss engine to the Devoe & Raynolds Company, Chicago; five pairs of vertical cross compound blowing engines, steam cylinders 46 and 86 x 60 inches and air cylinders 84 and 84 x 60 inches, to the Carnegie Steel Company, Pittsburgh; 79-inch air cylinder to the Jones & Laughlins Company, Limited, Pittsburgh; three 26 x 52 x 48 inch horizontal cross compound direct coupled Reynolds Corliss engines to the Union Steel Company, Pittsburgh; 18 x 42 inch girder frame Reynolds Corliss engine to the Willis Coal & Mining Company, Murphysboro, Ill.; 16 x 36 inch girder frame Reynolds Corliss engine to the Gunther Foundry Machine & Supply Company, San Antonio, Texas; 22 x 44 x 42 inch 1890 frame horizontal cross compound direct coupled Reynolds Corliss engine to the Studebaker Bros. Mfg. Company, South Bend, Ind.; 14 x 36 inch girder frame engine to the Colorado Milling & Elevator Company, at Monte Vista, Col.; 14 x 36 inch girder frame Reynolds Corliss engine to the Great Western Gold Company of California, and 16 x 36 inch Reynolds 1890 frame Corliss engine to the Park City Sampling Mills of Utah.

The contract which the Phoenix Iron Works Company, Meadville, Pa., have for the Farmers' Deposit Bank Building, in Pittsburgh, includes three tandem compound, noncondensing, direct connected engines of 240 horse-power, and one simple engine of 120 horse-power. It is proposed to make this a model plant. The contract of the Phoenix Iron Works Company covers only the engines for the new building.

The Water Works Trustees of Piqua, Ohio, will receive bids until June 24 for a 3,000,000-gallon compound duplex pump and two 60 x 16 boilers, for their proposed auxiliary pumping plant. W. B. Mitchell is secretary.

Some employees of the Warren City Boiler Works, at Warren City, Ohio, have gone out on a strike because of the discharge of the president of their union.

Foundries.

Clark's Iron Foundry, Philadelphia, Pa., will build an addition, 45 x 75 feet. The demand for large castings makes the enlargement necessary, the capacity running up to castings of 15 tons each.

The Cayuta Wheel & Foundry Company, Sayre, Pa., intend to erect a new plant, plans for which have not yet been completed. No new machinery will be required.

The Mechanics Foundry & Machine Company, Fall River, Mass., have taken out a permit to build two additions to their plant, one 50 x 50 feet and one 30 x 40 feet.

The St. Louis Enameling Company of Ninth and Monroe streets, St. Louis, Mo., want bids on their supply of malleable iron castings for the coming season.

Fires.

The Guenther Machine Works, San Antonio, Texas, were damaged to the extent of $15,000 by fire last week.

The plant of the Michigan Smelting & Refining Company, Detroit, Mich., was destroyed by fire last week. The loss will reach $5000.

The mills of the Rand Powder Company, about six miles from Uniontown, Pa., were wrecked by an explosion June 11.

The Alexander City Machine Company, Alexander City, Ala., suffered the loss of their plant in the fire which nearly wiped out the entire city, June 13.

The plants of the Exley Watkins Catsup Company, Wheeling Mattress Company and the Acme Box Company, at Wheeling, W. Va., were destroyed by fire June 12, entailing a loss of about $150,000.

The Standard Fire Pressed Brick Works, Pueblo, Col., were damaged $150,000 by fire June 12. The loss is covered by insurance.

Hardware.

The Empire Chain Company, recently organized in Pittsburgh, have received their charter and the capital stock has been increased from $1000 to $10,000. They began to make chain on June 16. The machinery is all new, including a gas engine furnished by the Bessemer Engine Company, Grove City, Pa., small hammers and two power hammers; also cutters and testing machines.

S. W. Card Mfg. Company, Mansfield, Mass., manufacturers of taps and dies, have completed an addition to their factory 75 x 40 feet, two stories high. All equipment has been ordered.

The plant of the Doebler Mfg. Company, formerly manufacturers of chucks and hardware specialties, Middletown, Conn., was sold at auction June 6 to Colonel Pride of New York. The plant at present is idle, but it is reported that the purchaser expects to enlarge it and continue the manufacture of hardware specialties.

The Ames-Dean Carriage Company are contemplating the building of a new carriage factory at Jackson, Mich. The structure will be 220 x 80 feet and three stories high.

The Sheet Mill Scale Settled.

At a conference held in Pittsburgh on Friday, June 13, between Persifor F. Smith, John Warner and Harry Cook, representing the American Sheet Steel Company, and the Sheet Mill Conference Committee of the Amalgamated Association, the wage scale governing sheet mills for the year ending June 30, 1903, was adopted. The scale is practically the same as the one which expires on June 30 next, the base rates being as follows:

It is agreed that when the actual average selling price of Nos. 26, 27 and 28 gauge plain sheet steel, f.o.b. mill, is 3 cents per pound the wages for rolling on a sheet and jobbing mill shall be as follows, with 2 per cent. additional for each one-tenth advance above said 3 cents selling price, and 2 per cent. decline for each deduction of one-tenth to said 3 cents selling price:

Gauges.	Price for rolling iron, per ton, 2240 lbs.	Price for rolling steel, per ton, 2240 lbs.
No. 8 and heavier	$3.60	....
Nos. 9 to 11	4.00	....
" 12 to 14	4.80	....
" 15 to 17	5.55	....
" 18 to 21	6.75	....
" 22 to 24	8.00	$8.80
" 25 to 26	9.20	10.12
No. 27	10.00	11.00
" 28	10.65	11.71
" 29	11.15	12.30
" 30	12.00	13.20
" 31	15.60	17.10
" 32	18.90	20.80

Gauges.	Price for rolling on a 3-cent card, per ton, 2240 lbs.
No. 8 and heavier	$3.00
Nos. 9 and 10	3.50
No. 11	4.00

This to apply to only jobbing mills rolling No. 18 and heavier over 48 inches in width.

The only changes made in the scale were in the foot notes. No. 4 was changed to read as follows:

No. 4. "All sheet iron or sheet steel shall be weighed by the company after being sheared and opened, and the company shall furnish the complete weight of each turn to the roller when run over and annealed in open furnace, or put the same in a convenient place in the mill within a reasonable time after being made."

In the sheet mill hands scale no changes were made, but a new foot note, No. 17, was added as follows:

"17. 25 gauge and lighter, double double eighty-four (84) pairs, shall equal 105 pairs of double iron, and not to be averaged. This to apply only to sheets sixty (60) inches long and shorter lengths."

In the scale for roughing and catching on sheet and jobbing mills no changes were made, but a new foot note, No. 7, was added, which reads:

"7. 25 gauge or lighter, double double 84 pairs, shall equal 105 pairs of double iron and not to be averaged. This to apply only to sheet 60 inches long and shorter lengths."

No time has yet been fixed for a conference between officials of the American Steel Hoop Company and the Amalgamated Association. At a recent meeting some changes in the foot notes of the bar iron scale were asked by the American Steel Hoop Company, and these are now being considered by the Amalgamated Association. It is probable another meeting will be held at an early date, perhaps this week or next week.

No time has been fixed for a conference between officials of the American Tin Plate Company and the Amalgamated Association, but a meeting will likely be held in New York City at a very early date, when the tin plate scale will be arranged. No changes were made in the prices in the scale submitted by the Amalgamated Association, but it is possible a few minor changes may be made in the foot notes. The sheet mill scale has been signed for the American Sheet Steel Company and also the tin plate scale by the American Tin Plate Company, in so far as the wage rates are concerned, but a conference is necessary in order to adjust the foot notes.

J. Gillespie, secretary and treasurer of the Lockport Iron & Steel Company, at Pittsburgh, has gone to Europe for three months.

The United States Shipbuilding Company.

Details of organization of the United States Shipbuilding Company have been officially announced. The company, organized under the laws of New Jersey, are to acquire the following concerns: The Union Iron Works, San Francisco, Cal.; the Bath Iron Works, Limited, and the Hyde Windlass Company, Bath, Maine; the Crescent Shipyard and the Samuel L. Moore & Sons Company, Elizabethport, N. J.; the Eastern Shipbuilding Company, New London, Conn.; the Harlan & Hollingsworth Company, Wilmington, Del.; the Canda Mfg. Company, Carteret, N. J.

The following are to be the directors of the company: Henry T. Scott, president Union Iron Works; Lewis Nixon, president Crescent Ship Yard; John S. Hyde, president the Hyde Windlass Company; E. W. Hyde, president Bath Iron Works, Limited; Charles R. Hanscom, president the Eastern Shipbuilding Company; Irving M. Scott, vice-president and general manager the Union Iron Works; Charles J. Canda, president Canda Mfg. Company; Horace W. Gause, president the Harlan & Hollingsworth Company; Daniel LeRoy Dresser, president Trust Company of the Republic; John J. McCook of Alexander & Green.

The plan of organization provides $10,000,000 preferred noncumulative and an equal amount of common stock. There is also to be a bond issue of $16,000,000, of which $5,500,000 is withheld for providing cash working capital and $1,500,000 is reserved in the treasury of the company. The remaining $9,000,000 of bonds, public subscriptions for which were received on June 18, it is said, have been fully underwritten. They are 5 per cent. first mortgage sinking fund gold bonds, due in 1932. They were underwritten, it is said, at 90. Although the issue price has been fixed at 97½, the underwriting agreement merely provides that the bonds shall not be sold for less than 95. The underwriters must suffer the diminution of the commission of 5 per cent. or more by the expenses of sale, but they are to receive, in addition to whatever net profit the bond sale yields, a bonus of 25 per cent. of their subscription in preferred stock and an equal amount of the common.

These bonds are secured by a first mortgage on the above mentioned plants, appraised as going concerns, at more than $20,000,000, in addition to which these companies will have a working capital of more than $5,000,000, and the constituent companies have now on hand contracts for work amounting to more than $36,000,000, on which the profits are estimated at over $5,000,000, or more than sufficient to pay interest on bonds and sinking fund for five years.

These plants are earning $2,225,000 per annum on the contracts now on hand, and have abundant facilities for additional work and increased earning capacity		$2,225,000
Fixed charges, 5 per cent. on $16,000,000	$800,000	
Sinking fund	200,000	
		1,000,000
		$1,225,000
Less annual dividends:		
6 per cent. on preferred shares, $10,000,000	$600,000	
Leaving for dividend on common shares, betterments and repairs, per annum	625,000	
		$1,225,000

The Trust Company of the Republic are acting as transfer agents and bankers. Alexander & Green of 120 Broadway, New York, are counsel.

Since the publication of the organization scheme it was officially announced that the company were to acquire also the Bethlehem Steel Company. J. D. Livingston, vice-president of the Trust Company of the Republic, stated to a representative of *The Iron Age* that the company held an option on the Bethlehem Steel Company and that additional capitalization would be required to finance this end of the project. The plan for this increase of capitalization has not as yet been fully determined upon. The Bethlehem Steel Company are capitalized at $15,000,000.

The Washington Coal & Coke Company, Pittsburgh, Pa., will build 100 more new coke ovens at their Star Junction plant in the Connellsville region, where this concern already operate 475 ovens.

The Iron and Metal Trades.

The scarcity of Pig Iron continues the salient feature all over the country. It has been aggravated in the East by the Anthracite Coal strike, which is causing the banking of some of the furnaces in the Schuylkill and Lehigh valleys, and is besides causing the furnaces in operation to make a heavier percentage of off grades. The Coal miners' strike in West Virginia is troubling the furnaces in the Ohio Valley, a number of which have been forced to stop producing.

Consumers are making inquiries concerning Pig Iron for 1903, and some business has been done. Apparently, however, these transactions are beset with difficulty. Melters of Southern Iron north of the Ohio River are asked to pay prices close to those now ruling, and at the same time take the risk of any change in freight rates, which would certainly advance considerably if present prices prevail next year. Some founders East and West have placed orders, but the majority seem to desire to await developments.

In the Steel trade the supply for the immediate future is still very restricted and importation orders in fair quantities are still being placed. It is an interesting fact that owing to freight conditions foreign material of all kinds can be laid down cheaper in Chicago than it can be put into Pittsburgh, so that Chicago is taking quite a considerable tonnage of foreign Iron and Steel.

It must be noted, however, that the first signs of the effect of the very extensive additions to open hearth steel capacity are appearing, and the feeling is gaining ground that later on the supply of Steel will become more liberal. It is a fact, too, that certain branches, like the Wire trade and the Sheet trade, are entering the dull season and that this may be expected to react on the supply of raw material.

In the heavy lines activity continues. Chicago notes additional sales of about 60,000 tons of Steel Rails for 1903 and some good contracts for Structural Material and for Plates have been placed.

A little uneasiness has been created in the Western markets by the desire on the part of jobbers to market Iron Bars. In the East the resumption of work at a number of mills has also caused some irregularity.

New competition appears to be telling on the Crucible Steel trade. Prices are not strictly adhered to, and concessions are somewhat promptly made to hold business.

There has been some irregularity also in Galvanized Sheets.

So far as can be judged, these happenings are confined to those branches of the finished trade in which the building of new plants has been particularly active. It does not necessarily follow that consumption has fallen off, but it may be inferred that it takes more to keep the works going full. If any raw material is released by an actual falling off in the consumption in the lighter branches it will be more than welcome in the heavy trades, which are almost hopelessly behind in their orders.

The Tin market has had one of its periodical surprises. There has been a sharp decline.

A Comparison of Prices.

Advances Over the Previous Month in Heavy Type, Declines in Italics.

At date, one month and one year previous.

	June 18, 1902.	June 11, 1902.	May 21, 1902.	June 19, 1901.
PIG IRON:				
Foundry Pig No. 2, Standard, Philadelphia	**$21.50**	$20.50	$19.75	$15.00
Foundry Pig No. 2, Southern, Cincinnat	**20.50**	19.75	18.75	13.25
Foundry Pig No. 2, Local, Chicago	**21.50**	21.50	21.00	15.00
Bessemer Pig, Pittsburgh	**21.50**	21.75	21.00	16.00
Gray Forge, Pittsburgh	**20.00**	20.00	19.75	13.75
Lake Superior Charcoal, Chicago	**24.00**	23.00	23.00	17.00
BILLETS, RAILS, ETC.:				
Steel Billets, Pittsburgh	**32.50**	32.25	32.00	24.50
Steel Billets, Philadelphia	30.00	....	Nom.	26.75
Steel Billets, Chicago	....	....	....	....
Wire Rods, Pittsburgh	37.00	37.00	37.00	39.00
Steel Rails, Heavy, Eastern Mill	28.00	28.00	28.00	28.00
Spikes, Tidewater	2.00	2.00	2.00	1.80
Splice Bars, Tidewater	1.90	1.80	1.60	1.40
OLD MATERIAL:				
O. Steel Rails, Chicago	**18.50**	19.00	17.50	13.00
O. Steel Rails, Philadelphia	**21.25**	21.00	21.00	15.00
O. Iron Rails, Chicago	24.00	24.00	24.00	18.50
O. Iron Rails, Philadelphia	24.50	24.50	24.50	19.00
O. Car Wheels, Chicago	**20.50**	20.50	20.00	16.50
O. Car Wheels, Philadelphia	**20.00**	19.50	19.50	17.50
Heavy Steel Scrap, Chicago	**19.00**	19.00	17.50	13.00
FINISHED IRON AND STEEL:				
Refined Iron Bars, Philadelphia	*1.95*	2.00	2.00	1.55
Common Iron Bars, Chicago	*1.75*	1.75	1.85	1.55
Common Iron Bars, Pittsburgh	1.80	1.80	1.80	1.45
Steel Bars, Tidewater	**1.95**	1.90	1.80	1.62½
Steel Bars, Pittsburgh	1.60	1.60	1.60	1.40
Tank Plates, Tidewater	2.00	2.00	1.95	1.75
Tank Plates, Pittsburgh	1.80	1.60	1.60	1.60
Beams, Tidewater	**2.10**	2.00	2.00	1.75
Beams, Pittsburgh (official)	1.60	1.60	1.60	1.60
Angles, Tidewater	2.00	2.00	2.00	1.75
Angles, Pittsburgh (official)	1.60	1.60	1.60	1.60
Skelp, Grooved Iron, Pittsburgh	*2.15*	2.15	2.22½	1.82½
Skelp, Sheared Iron, Pittsburgh	**2.35**	2.35	2.25	1.90
Sheets, No. 27, Pittsburgh	2.90	2.90	2.95	3.20
Barb Wire, f.o.b. Pittsburgh	2.90	2.90	2.90	2.90
Wire Nails, f.o.b. Pittsburgh	2.05	2.05	2.05	2.30
Cut Nails, Mill	2.05	2.05	2.05	2.00
METALS:				
Copper, New York	*12.25*	12.25	12.37½	17.00
Spelter, St. Louis	**4.75**	4.65	4.25	3.80
Lead, New York	4.10	4.10	4.10	4.37½
Lead, St. Louis	*3.97½*	4.00	4.00	4.27½
Tin, New York	*28.75*	30.50	30.00	28.15
Antimony, Hallett, New York	8.00	8.00	8.00	8.75
Nickel, New York	50.00	50.00	50.00	60.00
Tin Plate, Domestic, Bessemer, 100 pounds, New York	4.19	4.19	4.19	4.19

Chicago.

FISHER BUILDING, June 18, 1902.—(*By Telegraph.*)

With the continued scarcity of Pig Iron and the higher prices resulting, the entire market for the intermediate and finished products of Iron and Steel is assuming a changed aspect. Although there is no evidence at the moment that the policy respecting prices of the largest interest in the market will be changed there is growing conviction that prices of manufactured products must more nearly reflect the higher prices of raw material. Some of the largest independent interests, which have persistently refused to advance prices even from store, have shown a disposition, recently, to take a different view of the situation. There has been further liberal buying of Heavy Steel Rails by Western railroads, moderate buying by various consumers of Structural Material and buying of Pig Iron by Malleable founders and agricultural implement manufacturers for the first half of 1903. There still has been considerable inquiry for foreign material, but fewer transactions, although sales of considerable quantities of Billets and Rails are pending. In marked contrast to all other Iron and Steel products have been Bar Iron, Crucible Tool Steel and Galvanized Sheets, which material, from several causes, has been irregular, with lower prices prevailing. Offerings of speculative lots of Bar Iron

are having a depressing effect on that market and the determined efforts of more recent producers of Crucible Steel to market their output has caused lower prices for the lower grades of Tool Steel. Some independent mills have encouraged sales of Galvanized Sheets by granting more liberal discounts, which has resulted in lower prices on such material, but more prominence has been given to this fact than seems to be warranted by the volume of business transacted or by the concessions granted.

Pig Iron.—The result of the stringent market for Pig Iron, which is still experienced, is an advance of 50c. per ton on all Southern Irons for future delivery, Northern Iron, too, is tending upward strongly. Iron for immediate delivery is becoming scarcer with each week, and it is almost impossible to give reliable quotations, as it is a question of delivery, not of price. The little Iron of this character that is being sold commands from $2 to $3 per ton over the prices current for future delivery. The Southern furnaces even for the last quarter of the year are filling their books rapidly and some further sales, although not large—being only in individual lots from 2000 to 3000 tons—are being made for delivery during the first five and six months of 1903. One or two Malleable founders have placed a portion of their requirements for next year, but the majority of them are still holding off, there having been a meeting recently to consider the outlook, but the conference has not been followed by concerted action. Agricultural implement manufacturers, too, have been further testing the market for next year and sales have been made on the basis of $18 for No. 2 Foundry, Birmingham, delivered to buyers, or on the basis of $17, Birmingham, the buyer to assume the risk of an advance in freight rates, which it is anticipated will be about $1 per ton by the close of the present calendar year. With the extension of the strike among the Coal miners the outlook for an adequate supply of raw material to the consumer of Pig Iron is assuming a more serious aspect. It is asserted that the furnaces in southern Ohio will be out of blast this week, which fact, with the many furnaces banked in other sections, causes some uneasiness if not alarm among foundrymen. The difficulty in obtaining Iron promptly and the high prices prevailing have caused all sorts of anomalies, placing at naught the natural geographical distribution. There have been offerings of Virginia Forge Iron in this market during the week in several thousand ton lots, but at such high prices that mills have not been encouraged to purchase. While Scrap is scarce and high, it is relatively cheaper than Pig, and thus far mills have been able to secure an adequate supply, although the outlook for a continuance of this condition is not flattering. High Silicon Iron is in active demand, and with very little obtainable prices are much higher. Charcoal and Car Wheel Iron, whether in the North or South, is much in demand and commands higher prices when obtainable, Southern furnaces have shown more disposition to accept orders for 1903, and quite a heavy tonnage, it is anticipated, will be placed within the next few weeks. The very high prices have encouraged speculators to market all the Iron they have been able to accumulate, which, together with the offering of Iron which has been held in reserve by a few furnaces, and the sales for the latter quarter of this year and the first six months of next year, have aggregated a considerable volume. No little difficulty is being experienced in obtaining Iron upon contract time and not a few consumers are solicitous on this point, word coming from a few foundries that unless they receive Iron promptly they will be obliged to close down. The scarcity and higher prices for Coke are also an important feature in the market at the moment. We quote as follows:

Lake Superior Charcoal	$24.00 to $25.00
Local Coke Foundry, No. 1	22.50 to 23.00
Local Coke Foundry, No. 2	21.50 to 22.00
Local Coke Foundry, No. 3	21.00 to 21.50
Local Scotch, No. 1	22.00 to 23.00
Ohio Strong Softeners, No. 1	24.00 to 24.50
Southern Silvery, according to Silicon	22.65 to 24.65
Southern Coke, No. 1	22.15 to 22.65
Southern Coke, No. 2	21.65 to 22.15
Southern Coke, No. 3	21.15 to 21.65
Southern Coke, No. 1 Soft	22.15 to 22.65
Southern Coke, No. 2 Soft	21.65 to 22.15
Foundry Forge	20.15 to 20.65
Southern Gray Forge	20.15 to 20.65
Southern Mottled	20.15 to 20.65
Southern Charcoal Softeners, according to Silicon	22.00 to 22.50
Alabama and Georgia Car Wheel	25.00 to 26.00
Malleable Bessemer	22.00 to 22.50
Standard Bessemer	24.00 to 24.50
Jackson County and Kentucky Silvery, 6 to 8 per cent. Silicon	24.60 to 25.60

Bars.—The feature of the Bar Iron situation is that a number of jobbers who have purchased beyond their ordinary requirements, and have specified for July 1, are desirous of disposing of considerable lots, which are on the market at 1.75c., or even less, to avoid the expense of transferring to store. A number of independent mills, too, are offering and selling Bar Iron on the 1.75c. basis. The combination mills, however, are making little or no effort to sell, and are quoting nothing under 2.10c. for mill shipment. From store Bar Iron is still held at 2.25c. There has been a fair volume of business in small lots of Soft Steel Bars, with one or two large contracts pending, and prices have remained firm at 1.75c. to 1.90. Hoops at 2.15c. to 2.25c., and Angles at 2.25c., base, mill shipment. There has been no perceptible decrease in the urgent demand for small lots from store, a strong tone prevailing, with sales of Soft Steel Bars made at 2.25c., Angles at 2.50c. and Hoops at 2.50c., base.

Structural Material.—Activity continues and a strong tone prevails. Orders for about 15,000 tons have been placed during the week for delivery during the first six months of 1903. The jobbing demand has continued very active, and full prices have been readily obtained for all kinds. There is still some inquiry for foreign material, but no sales of moment have come to the surface during the week. Mill shipments are quoted as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c. Small lots of Beams and Channels from local yards are quoted at 2.50c. to 3.50c.; Angles, 2.50c. to 3.50c. rates; Tees, 2.55c. to 3.50c. rates.

Plates.—A very strong tone has continued to command the market, and with raw material tending upward strongly higher prices have been asked and obtained from store. Mill prices are as follows: Tank Plate, ¼-inch and heavier, 1.75c. to 2.25c.; Flange, 1.85c. to 2.35c.; Marine, 1.95c. to 2.50c. The jobbing trade has been especially heavy, and inside prices have been advanced, the following being the current quotations: Tank Steel, ¼-inch and heavier, 2.20c. to 2.40c.; Tank Steel, No. 8, 2.35c. to 2.50c.; Flange, 2.30c. to 2.60c., all f.o.b. warehouse, Chicago.

Sheets.—There have been freer offerings by independent mills, and although there has been a fair demand the market has been weaker, especially for Galvanized Sheets, which have sold at lower prices, although there has been no change in the net quotations made by the combination. The system of discount still adhered to by the independent mills results in the shading of prices herewith given. Mill shipments, No. 27 Black Sheets, are quoted at 3.15c. to 3.25c., Chicago, and small lots from store, 3.45c. to 3.55c. Galvanized Sheets, net prices, mill shipment, are held on the basis of 4.45c. to 4.50c., and small lots from store at 4.70c. to 4.75c. for No. 27. Discounts are allowed, however, by certain mills.

Cast Pipe.—There has continued to be a fair demand for both Water and Gas Pipe, and orders have been well distributed; but few large contracts, however, have been placed during the week. Bids for Seattle, Wash., were opened during the week, but the award has been postponed until the latter part of the month. Cast Iron Water Pipe is quoted by manufacturers as follows: 4-inch, $34; 6-inch, $32; 8-inch and upward, $31; Gas Pipe, $1 per ton higher than Water, f.o.b. Chicago.

Merchant Pipe.—There has been an improved demand and a steady market without essential change in prices. Carloads are quoted as follows, random lengths: Black, ⅛ to ½ inch, 56½ off; ¾ to 12 inches, 63½ off; Galvanized, ⅛ to ½ inch, 43½ off; ¾ to 12 inches, 50½ off.

Boiler Tubes.—There has been a fair demand and a firm market without essential change in prices. Quotations for mill shipment are as follows:

	Steel.	Iron.
1 to 1½ inches	42½	39
1¾ to 2½ inches	55½	38
2¾ to 5 inches	61	48
6 inches and larger	55½	38

There has been a good demand for store and a firm market. The prices from store are as follows:

1 to 1½ inches	35	35
1¾ to 2½ inches	47½	32½
2¾ inches to 5 inches	55	42½
6 inches and larger	47½	..

Merchant Steel.—A fair volume of business has been transacted, but on some grades, notably Crucible Tool Steel, there has been some irregularity due to the efforts of independent producers, who have been shading the prices made by the larger and older companies. Not only have discounts been allowed on previous prices, but direct quotations have been reduced, especially on the lower grades. On the higher grades, however, the competition has been less apparent, although lower prices have been made on specials. Mill shipments are quoted as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.95c. to 2.10c.; Open Hearth Spring Steel, 2.65c. to 2.75c.; Toe Calk, 2.25c. to 2.40c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 50 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted at 6½c. to 7c. for mill shipments; specials, 12c. upward.

Rails and Track Supplies.—Further large contracts have been placed by Western railroads during the week, about 60,000 tons having been sold for 1903 delivery here, and other large contracts are pending, about 50,000 tons have been placed in the East also. There have also been smaller sales on the same basis, $28 at the mill for Heavy Sections. There has been a fair demand, with sales of Light Sections at prices ranging from $35 to $40 per ton, according to weight and the time of delivery. Track Supplies have continued in active demand and strong without further change in prices. Fastenings are quoted in carload lots: Splice Bars or Angle Bars, 2c.; Spikes, 2.40c. to 2.50c.; Track Bolts, with Hexagon Nuts, 3.10c. to 3.45c.; Square Nuts, 2.95c. to 3.10c.

Billets.—There has continued to be an active demand for both domestic and foreign Bessemer and Open Hearth Billets, with sales of 2000 tons of Open Hearth at $38 and smaller lots at $40 to $42, Chicago, according to analysis, time of delivery and responsibility of buyer. Foreign Bessemer Billets are quoted at $31.50 to $32 for fall delivery, Chicago, but no transactions of moment have been reported during the week.

Old Material.—The high prices prevailing for Pig Iron have thrown mill consumption more largely upon Scrap, and with only moderate offerings the market has remained steady. On some grades there is a growing scarcity, with a tendency of prices upward. There have been sales of 300 tons of Heavy Relaying Rails at $32.50. The offerings are light. Malleable Scrap is also scarce, but the demand is not active. The following are the approximate quotations per gross ton:

Old Iron Rails	$24.00 to $25.00
Old Steel Rails, mixed lengths	18.50 to 19.50
Old Steel Rails, long lengths	23.50 to 24.50
Heavy Relaying Rails	31.50 to 32.50
Old Car Wheels	20.50 to 21.50
Heavy Melting Steel Scrap	19.00 to 20.00
Mixed Steel	15.50 to 16.00

The following quotations are per net ton:

Iron Fish Plates	$21.50 to $22.50
Iron Car Axles	24.50 to 25.00
Steel Car Axles	22.00 to 23.00
No. 1 Railroad Wrought	21.00 to 22.00
No. 2 Railroad Wrought	18.00 to 19.00
Shafting	18.50 to 19.00
No. 1 Dealers' Forge	16.00 to 16.50
No. 1 Busheling and Wrought Pipe	13.50 to 14.00
Iron Axle Turnings	14.00 to 15.00
Soft Steel Axle Turnings	13.50 to 14.00
Machine Shop Turnings	13.00 to 13.50
Cast Borings	9.00 to 9.25
Mixed Borings, &c	9.50 to 10.25
No. 1 Boilers, cut	13.00 to 13.50
Heavy Cast Scrap	14.50 to 15.00
Stove Plate and Light Cast Scrap	10.50 to 11.00
Railroad Malleable	16.00 to 16.50
Agricultural Malleable	14.00 to 14.50

Metals.—There has been a fair demand and a firmer market for Copper, Lake selling at 12½c. carload lots, and 13½c. in a jobbing way. Pig Lead has been in good demand and firm at 4.05c. for Desilverized in 50-ton lots, and 4.07½c. in carload lots. Selling prices on small lots of Old Metals are as follows: Heavy Cut Copper, 11¼c.; Red Brass, 11¼c.; Copper Bottoms, 10c.; Lead Pipe, 3.80c.; Zinc, 3⅜c.

Coke.—There has been an active and even an urgent demand, with very light offerings and with very little supply available in the East, and higher prices have been readily obtained. Connellsville 72-hour Foundry Coke is wanted at $5.50, and Virginia and West Virginia has sold at $5.50 per ton, Chicago.

Philadelphia.

FORREST BUILDING, June 17, 1902.

Conditions in the Iron and Steel trades cannot be said to have become any clearer since date of our last report. Work is being done at very short range, and in many cases it is simply a question of two or three days to determine whether to continue or to stop entirely until a reasonable sufficiency of raw materials can be accumulated. As the midsummer holidays are close at hand there will be an effort to work as full as possible until the end of the month, after which the date for resumption will depend upon developments which may occur in the interim. There is an unprecedented amount of work on hand, and under normal conditions every shop in the country could be run to its utmost limit, but with a shortage of coal, a shortage of coke and a shortage of Pig Iron, it is impossible to make satisfactory progress. Foreign material is arriving pretty regularly and in considerable quantities, too, but the effect on the market is more of a negative character than otherwise—that is to say, it checks an advance rather than induces weakness, and to that extent it is somewhat helpful. There are no evidences of any falling off in general business, and if crop conditions are maintained on their present level, there is every reason for believing that the last half of 1902 will be a record breaker.

Pig Iron.—There is a greater scarcity of Pig Iron today than at any time on record. Price has nothing to do with it; the point is to find the Iron, and when that is done there is no difficulty in arranging prices. For July and August shipments of No. 2 X Foundry prices vary from $22 to $22.50, and for the last quarter of the year $21.25 to $21.75, but sellers are not seeking business and quotations are not given unless specifically requested by the regular trade. Sellers are not inclined to discount long deliveries to any extent, as they are already sold pretty well to their full limits, and are therefore inclined to see "which way the cat jumps" before they make further commitments. Some business has been entered for the first half of 1903 at prices ranging from $20.75 to $21.25 for No. 2 X Foundry, but makers now quote more money or request to be excused from naming any figure which will involve long date deliveries. Some large orders have been accepted, however, subject to price at time of delivery, the point with the buyer being to secure a sufficient quantity of known brands as an insurance against such conditions as now prevail—viz., to take whatever brand can be had, regardless of what may be desired. As regards the immediate outlook, it appears as though there will be no material change for several weeks to come, for the reason that the midsummer holiday will naturally lead to a decreased consumption, during which period adjustments may be made which may ultimately result in easier conditions. In any case there will be a better opportunity for estimating the situation than appears to be possible at the present time. Following are quotations for Pig Iron for city and nearby points for deliveries during the last quarter of the year, July, August and September deliveries being anywhere from 50c. to $1 more money:

No. 1 X Foundry	$23.00 to $23.50
No. 2 X Foundry	21.50 to 21.75
No. 2 Plain	20.75 to 21.25
Standard Gray Forge	19.00 to 19.50
Ordinary Gray Forge	18.50 to 18.75
Basic	19.50 to 20.50
Low Phosphorus	22.50 to 23.00
No. 3, Middlesbro (prompt shipments)	20.50 to 21.00
Scotch Irons	21.50 to 23.00

Billets.—The demand is not as urgent as it was, the arrivals and additional purchases of foreign material having to a considerable extent met the urgent needs of consumers for the time being. Foreign Steel is steady and unchanged at $30 to $31.50; American slightly easier at $34 to $34.50 for deliveries late in the year.

Plates.—The situation in the Plate trade is unchanged and at the moment gives no indication of change in the near future. Mills have their order books well covered, but the capacity for production is large, so that business can be placed at about 2c. for ordinary ¼-inch Plates. Deliveries are fairly well on time, but new business would probably have to be carried over to August or September, as heavy shipments are required during the intervening period. Prices are about as follows for Philadelphia and nearby points: Small lots, 2.10c. to 2.15c. Carload lots and upward: ¼-inch and thicker, 2c. to 2.05c.; Universals, 2c. to 2.05c.; Flange, 2.10c. to 2.20c.; Fire Box, 2.25c. to 2.30c.; Marine, 2.30c. to 2.35c.; Charcoal Plates, C. H. No. 1, 2½c.; C. H. No. 1 Flange, 3c.; C. H. No. 1 Flange Fire Box, 3½c.

Structural Material.—There is the same old complaint in regard to deliveries, but as this appears to be a chronic condition it attracts less notice than formerly. Deliveries of foreign material can be made from store or on dock at from 2.25c. to 2.50c. for Beams and Angles, although in some cases local mills have had business at one to two or three tenths more than the figures named.

Bars.—The market is irregular and events during the past few days have shown that prices are liable to shade off a trifle. The resumption of work at the Lancaster and Columbia mills will increase the supply, and as there was no particular scarcity while they were closed, buyers are disposed to look for better terms in the near future. Asking prices are 2c. to 2.05c., but business has been taken at 1.95c., and from that to 2c. may now be regarded as full prices for carload lots of Refined Iron. Steel Bars are hard to get; the nominal price is 1.72c. to 1.80c., but 2c. and upward is named as the best figures which can be done to be sure of getting deliveries.

Sheets.—The demand is fair, but not specially heavy, considering the season. Prices are unchanged and best Sheets are quoted as follows, and a tenth less for common Sheets (in carload lots): Nos. 10 and 12, 2.40c. to 2.60c.; No. 14, 2.70c.; Nos. 16 and 17, 3c.; Nos. 18-21, 3.30c.; Nos. 26, 27, 3.40c.; No. 28, 3.50c.

Old Material.—The market presents a more active appearance owing to a resumption of work at the mills which have been in operation for several weeks past. There is a better demand and holders are asking more money, and getting it in the majority of cases. Bids and offers for deliveries in buyers' yards: Low Phosphorus Scrap, $25 to $26; Heavy Melting Steel, $21 to $21.50; Steel Rails, short lengths, $21.25 to $21.75; Choice Railroad Scrap, $24 to $25; No. 1 Yard Scrap, $19 to $20; No. 2 Light Forge, $18 to $19; No. 2 Light, old, $15 to $16; Machinery Cast, $18.50 to $19; Iron Rails, $24.50 to $25.50; Old Car Wheels, $20 to $21; Iron Axles, $29 to $30; Steel Axles, $27 to $28; Wrought Turnings, $16 to $17; Cast Borings, $10.75 to $11.25.

Cincinnati.

FIFTH AND MAIN STS., June 18, 1902.—(*By Telegraph.*)

The strike in the Coke regions is having a rather depressing effect on the Pig Iron market, and prices are higher as a consequence. With the exception of irregular lots and grades there is still but very little spot Iron offered. Many of the Southern furnaces are entirely withdrawn from the market. Some of these are informing their agents that they will have some Iron to sell later in the year, which will be available for the last quarter, but the impression seems to be that, all told, this does not constitute a reserve on which very extensive trade hopes can be built. Quite a number of buyers are coming into notice with inquiries regarding Iron for 1903 delivery, but furnaces do not seem willing to make figures so far ahead as yet. The general impression is that these inquirers are simply throwing out feelers, and are not seriously seeking Iron just now for next year. The market for spot Iron is irregular, though the general idea seems to be that $17.50 to $18, Birmingham, for No. 2 is as near the actual value as can be determined. Freight rate from Hanging Rock district is $1.10 and from Birmingham $2.75. We quote, f.o.b. Cincinnati, as follows:

Southern Coke, No. 1	$21.00 to $21.25
Southern Coke, No. 2	20.50 to 20.75
Southern Coke, No. 3	20.00 to 20.25
Southern Coke, No. 4	19.50 to 19.75
Southern Coke, No. 1, Soft	21.00 to 21.25
Southern Coke, No. 2 Soft	20.50 to 20.75
Southern Coke, Gray Forge	19.50 to 19.75
Southern Coke, Mottled	19.50 to 19.75
Ohio Silvery, No. 1	24.10 to 24.85
Ohio Silvery, No. 2	23.60 to 24.10
Lake Superior Coke, No. 1	24.60 to 25.10
Lake Superior Coke, No. 2	24.10 to 24.60
Lake Superior Coke, No. 3	23.60 to 24.10

Car Wheel and Malleable Irons.

Standard Southern Car Wheel, chilling grades	$25.50 to $26.00
Standard Southern Car Wheel, No. 2	25.00 to 25.50
Lake Superior Car Wheel and Malleable	25.00 to 26.00

Plates and Bars.—There appears to be no change to note in the market. The situation shows strength and some activity. We quote, f.o.b. Cincinnati, as follows: Iron Bars, carload lots, 1.90c. to 2c., with half extras; same, in small lots, 2.20c., with full extras; Steel Bars in carload lots, 1.72c., with half extras; same, in small lots, 2.20c., with full extras; Angles, 2.30c. to 2.50c.; Plates, 3-16 inch and heavier, 2c.

Old Material.—The market is firm, though not remarkably active. We quote dealers' buying prices, f.o.b. Cincinnati: No. 1 Wrought Railroad Scrap, $20 per net ton; Iron Axles, $23 to $25 per net ton; Cast Machine Scrap, $14.50 to $15 per gross ton; Steel Rails, rolling mill lengths, $24 to $24.25; same, short lengths, $17 to $17.50 per gross ton; Car Wheels, $19 to $19.50 per gross ton.

St. Louis.

CHEMICAL BUILDING, June 18, 1902.—(*By Telegraph.*)

Pig Iron.—In the interval since our last report the volume of transactions in the market for Pig Iron has been on a moderate scale. Offerings of Iron, which have been in small volume for some time past, are distinctly lighter now, and in the matter of prices the movement has been to a materially higher level. We hear of quotations for No. 2 Foundry at the furnace from $16.25 to $18.50, but the volume of sales at the higher range is in small proportions. While the market is very quiet now it would seem that it cannot remain so very long, as it is coming to the time when many foundry interests will come into the market for future requirements, and unless a more liberal supply of material than now can be offered it would seem that a general stiffening in prices would come about. The following is the range of prices current for cash, f.o.b. St. Louis:

Southern, No. 1 Foundry	$20.25 to $22.50
Southern, No. 2 Foundry	19.50 to 21.75
Southern, No. 3 Foundry	19.00 to 21.25
Southern, No. 4 Foundry	18.50 to 20.75
No. 1 Soft	20.00 to 22.25
No. 2 Soft	19.50 to 21.75
Gray Forge	17.75 to 18.00
Southern Car Wheel Iron	23.00 to 24.00
Malleable Bessemer	22.00 to 23.00
Ohio Silvery, 8 per cent. Silicon	.... to 22.00
Ohio Strong Softener, No. 1	22.00 to 23.00
Ohio Strong Softener, No. 2	21.00 to 22.00

Bars.—Among the jobbers a fair volume of trade is reported in the market for Iron and Steel Bars and prices are firm at the recent level. We quote, from the mills, Iron Bars at 1.90c.; Steel Bars at 1.90c. to 2c. Jobbers quote Iron Bars at 2.25c.; Steel Bars at 2.25c. full extras.

Rails and Track Supplies.—The large demand and inquiry for Rails and Track Supplies continues, and in the matter of price-list we note no change. We quote: Splice Bars at 2.10c. to 2.15c.; Bolts, Square Nuts, 3c. to 3.10c.; with Hexagon Nuts, 3.25c. to 3.30c.; Spike, 2.35c. to 2.45c.

Angles and Channels.—Small Angles and Channels are in good demand, say the jobbing trade, and in the matter of prices the recent quotation of $2.50, base, for materials of this class continues to rule.

Sheets.—A very good volume of trade, which includes all the various grades and sizes of Sheets, is being cared for by the jobbing interests, and in the matter of prices a generally firm and hardening tendency is to be noted.

Pig Lead.—The volume of transactions in the market

for Pig Lead is of a limited order and in the matter of prices the fluctuation is insignificant. Chemical is quoted at 3.97½c. and Desilverized at 4c.

Spelter.—The situation in the Spelter market shows no material change of improvement and the curtailment in production, due to the strikes among the workmen at the smelters, it is said, will be felt quite seriously when any urgent demand may come into market. It is said at this time that owing to the limited offerings for July futures a liberal premium is being paid. We hear of quotation as high as 5c.

The combined sales departments in St. Louis of the Illinois Steel Company, Carnegie Steel Company and American Steel Hoop Company have removed from the Chemical Building to the new Bank of Commerce Building, where they are now located in a suite of fine spacious offices.

Birmingham.

BIRMINGHAM, ALA., June 16, 1902.

The market for Iron shows no abatement of demand and firmness in prices yet prevails. There is nothing in the situation here to encourage the conclusion that a recession in prices is near at hand. The demand, while it still is for medium and small sized lots, is sufficiently great to absorb all that can be coaxed on the market, and then be satisfied only in part. The larger interests are yet put to it in making deliveries on old business, and are catching up at a slow rate. So that some buyers who have Iron due but can't get it as fast as their necessities demand are compelled to supply their deficiencies by entering the market as buyers of prompt Iron. How long this condition will last is the puzzle that only the future can solve. As long as it lasts the outlook for lower prices is not encouraging. Every day confirms the correctness of the conclusion so often emphasized in these letters—*i. e.*, an accumulation, either real or prospective, in stocks of Iron must precede a decline in prices. There is no sign of either yet. Stocks are practically *nil*. While the larger interests are practically retired from the general market, they are taking care, in so far as they can, of their regular customers, and in a limited way supplying their wants. As one interest expressed it, "Circumstances forced a retirement from the market, and we are not in touch with it." There was an indisposition to report the business of the past week. But some sales were run down and sufficient facts obtained to construct market prices. Some No. 1 Foundry sold at $19, No. 2 Foundry sold at $18, and No. 3 Foundry at both $17 and $17.50. No. 4 Foundry is $17, and Gray Forge would be $16.50 if it could be had. There is no regular, uniform price for ence between grades, nor is there a uniform price for single grades. There is frequently a difference of 50c. in asking price of two sellers for the same grade, and it occurs that each obtains the price he asks. The idea of each particular seller as to the price is the only guide followed, and so far it has been a winner. For delivery last half of 1902 the asking price is yet on the basis of $17 for No. 2 Foundry, but if any sales were made they were not reported. Some inquiries were on the market for delivery the first quarter of 1903. The price asked was also on the basis of $17, but no sales were reported. The volume of these inquiries was not large. The reported shipments for the month of May from Alabama and Tennessee were 151,174 tons of Pig Iron. Of this amount, 76,548 tons went from the Birmingham district. Shipments of Cast Iron Pipe approximated 17,000 tons, of which this district furnished nearly 8000 tons. The shipments of Steel approximated 12,000 tons. The output for May was published as 15,000 tons. The entire battery of ten furnaces will soon be in commission. The report of the Car Service Association of cars moved during May showed a total of 51,538, as against 42,713 in May, 1901. The increase was 8825 cars.

The Alabama Consolidated Coal & Iron Company have concluded to erect a new furnace at Gadsden, where they already have two stacks. The new stack will be 95 feet high and 19 feet in the bosh. The calculation is that it will be ready for business in January, 1903. It is at present contemplated to enlarge one of the old furnaces there to the same dimensions and thus greatly add to the output at that point. But the change, if made, will follow the erection of the new furnace.

It has been known to your correspondent for some time past that the establishment of a new furnace plant was in contemplation by James Bowron (late treasurer of the Tennessee Company) and associates. They have had the matter under quiet consideration, maturing their plans, and it seems they have finally reached a definite conclusion and have determined to erect it. There is no doubt of their ability to secure the necessary capital, and we can confidently count upon a re-enforcement of two important furnaces to the producing capacity of the district. The location of the plant will be north of us and on the Alabama & Great Southern Railroad, about 25 miles this side of Chattanooga and at or near Sulphur Springs. The practical experience of the projectors in furnace needs justifies confidence in the belief that any selection of location made by them will combine all the desirable requisites of substantial and successful results.

In well posted circles it is a matter of common gossip that some Pennsylvania Iron people who sold out their interests to the trust have definitely concluded to reinvest in this district and erect furnaces and a Steel plant. As yet nothing definite is concluded. The evidence is that they have the will, and "where there is a will there is a way." The contemplated enterprise will require a $2,500,000 investment. Several months ago this matter was mentioned in these letters. Its fruition now seems probable.

After several disappointments in the perfect harmonious working of the minor parts, the new furnace of the Republic Company at Thomas was successfully put in commission the past week. The first run was very satisfactory, and great things are anticipated of this latest up to date addition to our producing capacity. So far, the indications are that it will make a record that others may emulate but hardly excel.

The American Car & Foundry Company, who are known as a very strong corporation, have announced in a letter from their president to Mr. Yoacum, president of the San Francisco railway system, a desire to locate the plant here, provided the land necessary for such a large plant and other necessary and desirable facilities can be secured. We are being courted so much that we are losing our coyishness, and our maidenly modesty is subservient to "an eye for the main chance." As the output of the company is 40 cars per day and multimillions represent their capital, all necessary conditions will, without doubt, be complied with. We can add to our stock "the pleasures of anticipation," which those of realization only can exceed.

The Decatur Car Wheel Company have changed owners. The purchasers are Messrs. Morrison, Nute and Grissom, one of whom at least is connected with a similar enterprise at St. Louis. Speculation is rife as to intentions of buyers, but they are not making publication of their plans.

The Highland Land & Improvement Company, capitalized at $25,000, were incorporated the past week, and the Thompson Land & Development Company, who, it is said, will influence and control considerable Eastern capital, are in process of formation.

The Drop Forge & Edge Tool Company have secured a site near Ensley and will soon be at work. They will make all edge tools from razors to axes. They are said to have no Southern rival and to be the pioneers in this section of this specialty. The San Francisco railway system have purchased the Belt Railroad and will endeavor to improve and popularize it. As this system and the Seabord Air Line are very friendly, it is inferred that the contentions between the Belt Line and the Seaboard Line will be settled to mutual satisfaction and turn loose several hundred thousand dollars for expenditure here which the litigation had tied up. The Southern Railroad is credited with the purchase of $200,000 of realty here (of late), to be utilized to increase terminals and accessories, &c.

The activity in coal is shown by the fact that the Blue Creek division of the Tennessee Company lately loaded 100 cars in one day.

The Warner Mine of the Republic Company, which is a single track slope mine, turned out in May (22 days' work) 41,145 tons, say 1296 cars, or 51 trains of 25 cars each. About 600 miners are at work there.

The ten-story Woodward Building is under roof and is being rapidly pushed to completion. The skyscraper of the Title Guaranty Company is progressing, and plans for the contemplated 12-story building are almost matured. The contract for erection will soon be let. Then there is another 12-story hotel building being considered, and the probability of its successful hatching is very good. Other improvements being undertaken are too numerous to mention. Labor of all kinds, from skilled artisans to day laborers, is in demand, and the supply is inadequate. The Miners' Association meets on the 20th inst. to fix scale for the ensuing year. There has been nothing developed so far to indicate whether there will be dissatisfaction and war between employers and employees, or contented peace. We can only await developments, whose unfolding will excite a keen interest. There is nothing known at present writing that is reliable of the desires or intentions of the body, but there are soothsayers and "prophets of evil" abroad in the land.

Pittsburgh.

(By Telegraph.)

PARK BUILDING, June 18, 1902.

Pig Iron.—The advance of 10 per cent. in wages given by the blast furnace operators in the Mahoning and Shenango Valleys gives the men the highest wages they have received for years. Top and bottom fillers are now paid $2.20 per day, while common labor is paid $1.65. The Pig Iron market has been quiet in the past week, furnaces being practically sold up for the next four to six months and buyers are covered. The recent strike took 50,000 to 75,000 tons of Iron out of the market and the scarcity of metal is more keenly felt than ever. The furnace operators are giving their attention to filling old contracts for Iron in preference to making new ones. The market is very strong and standard Bessemer is $20.75 to $21, Valley, or $21.50 to $21.75, Pittsburgh. Forge Iron is $20 to $20.25 and No. 2 Foundry $21 to $21.50, Pittsburgh. We note a sale of 4000 tons of Bessemer, July, August, September and October delivery, at $20.75, Valley furnace.

Steel.—The market is somewhat quiet, buyers holding off as much as possible in the belief that with so much new Open Hearth capacity coming on the market prices of Steel may be lower in the last three or four months of the year. Several concerns that have recently put up Open Hearth furnaces and make more Steel than they need are offering their surplus product in the market. Domestic Billets, Bessemer and Open Hearth, are $33 to $34, Pittsburgh, depending on tonnage and deliveries wanted. Foreign Billets and Sheet Bars can be laid down at about $32.50, Pittsburgh. There is a good deal of inquiry for Small Billets, and they are hard to obtain.

(By Mail.)

All traces of the recent strike at the blast furnaces in the Shenango and Mahoning valleys have disappeared, the men at all the furnaces having received a 10 per cent. advance in wages, including the employees of the blast furnaces of the National Steel Company, at Youngstown, New Castle, Warren and Niles, and also at all the furnaces of this concern, and of the Carnegie Steel Company and American Steel Hoop Company in the Pittsburgh district. The action of the court in New Jersey in making permanent the temporary injunction granted restraining the United States Steel Corporation from retiring $250,000,000 in preferred stock and issuing $200,000,000 5 per cent. bonds was a good deal of a surprise to the trade here, but it is the general opinion that the higher court to which the case has been appealed will set aside the injunction. Nothing of special importance has occurred in the Iron trade this week, the situation being quiet as far as new tonnage is concerned, but prices are very firm. Nearly all the wage scales have been signed, and there will be no shut down of the mills this year, except for stock taking and needed repairs.

Ferromanganese.—German Ferro is held at $49 and English at $50, delivered in the Pittsburgh district. English Ferro always commands about $1 a ton higher than German, as it is lower in phosphorus. The large consumers here have covered their requirements of Ferro for this year and into next year, and it is not unlikely that prices of foreign Ferro will soon be advanced on account of the heavy demand from this country. No domestic is being offered.

Rails.—Altogether, 700,000 to 800,000 tons of Rails have been placed for next year, and some large contracts are pending. We quote at $28 at mill.

Structural Material.—There seems to be no limit to the demand, and the Bridge and Structural mills are filled up with tonnage for months ahead, and a good deal has been booked for next year. Official prices no longer cut any figure in the market, as round lots of Beams for shipment within two to three months have sold at 2.50c. to 3c., while small lots bring still higher prices. The tonnage in Structural Material this year will be the heaviest ever known and promises to be as large next year, as a good deal of building has been put off that will likely come up in 1903. Pool prices are as follows: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inches, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.50c., half extras, at mill; Universal and Sheared Plates, 1.60c. All above prices are f.o.b. Pittsburgh.

Sheets.—Demand for the heavier gauges of Sheets up to 18 and 20 is heavy, and the mills are filled up; but on the lighter gauges demand has fallen off very much. It is said that some of the mills are naming slightly lower prices on the lighter gauges of Sheets for delivery in the second half of the year. We quote Black Sheets, box annealed, one pass through cold roll, at 2.90c. to 3c. for No. 27 and 3c. to 3.10c. for No. 28. Sheets for prompt shipment bring as high as 3.15c. to 3.25c. for No. 28. Jobbers charge from $2 to $5 a ton advance for small lots from store. We quote Galvanized Sheets at 70, 10 and 5 off in carloads and 70 and 5 to 70 off for small lots. All these prices are f.o.b. at mill.

Plates.—Plates are a good deal like Structural Material, in the fact that leading mills are sold up for months, and sellers who can make deliveries of Plates within two to three months can get from 1.80c. to 2c. at mill for them. Official prices are as follows: Tank Plate, ¼ inch thick and up to 100 inches in width, 1.60c. at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days. It should be noted, however, that mills that can make reasonably prompt deliveries of Plates can get from $3 to $5 a ton advance over the official prices.

Muck Bar.—Prompt deliveries of Muck Bar are hard to get, and prices are high. We quote best grades of Muck Bar at $36.50 to $37, Pittsburgh.

Spelter.—We quote Prime Western Spelter at 4.60c. to 4.62½c., Pittsburgh. We note a sale of 50 tons at the lower price.

Bars.—A few of the outside mills that roll Iron Bars are reported as selling at less than official price, which is 1.80c., Pittsburgh. However, the market on Iron Bars in this district is very firm. The large buyers of Steel Bars covered their season's requirements prior to April 1 at the old price of 1.50c., and are now specifying heavily on these contracts. A moderate amount of new tonnage is being placed which brings the full price of 1.60c. We quote Steel Bars at 1.60c., half extras, for carloads and larger lots, while small lots bring 1.70c. to

1.75c. All specifications for less than 2000 lbs. of a size are subject to the following differential extras: Quantities less than 2000 lbs., but not less than 1000 lbs., 0.10c. per lb. extra. Quantities less than 1000 lbs., 0.30c. per lb. extra. The total weight of a size to determine the extra, regardless of length. We quote Iron Bars at 1.80c., Pittsburgh, extras as per National Bar Iron Card.

Merchant Steel.—The feature of the market is the fact that some low prices are being made on Crucible Tool Steel by a few of the mills whose brands are not so favorably known. Established brands of Crucible Steel bring full prices, and the market is firm. We quote: Open Hearth Spring Steel at 2.30c. to 2.50c.; Toe Calk, 2.25c. to 2.35c.; Tire Steel, best grades, 2.15c. to 2.25c.; Cold Rolled and Cold Drawn Shafting, 50 per cent. off in carloads and 45 per cent. off in less than carloads in basing territory; Tool Steel, 6½c. to 7c. for ordinary grades and 12c. and upward for best grades, all f.o.b. mill, terms net 30 days.

Skelp.—We note a heavy demand and the market is very firm. We quote Grooved Iron Skelp at 2.15c. to 2.25c. and Sheared at 2.35c. to 2.40c., prices depending on the gauge. Grooved Steel Skelp is about 2.25c. and Sheared $2 to $3 a ton advance, depending on the size of the order and the gauges.

Boiler Tubes.—A good deal of new tonnage is being placed and the mills are very well filled up for the next two or three months. There is no change in prices and discounts in carloads are as follows:

Boiler Tubes.	Up to 22 feet.
Steel.	Per cent.
1 to 1½ inch, inclusive	45
2¾ inch to 5 inch, inclusive	62½
1¾ inch to 2½ inch and 6 inch to 13 inch, inclusive	52½
Iron.	
1 to 1½ inch, inclusive	42½
2¾ inch to 5 inch, inclusive	50
1¾ inch to 2½ inch and 6 inch to 13 inch, inclusive	40

Merchant Pipe.—Some heavy contracts for gas and oil lines have been placed and the mills rolling the larger sizes of Pipe, from 8-inch up, are filled for months ahead. Current tonnage is also large and prices are very firm. Discounts in carloads are as follows:

Merchant Pipe.	Black.	Galvd.
⅛ to ¼ inch, inclusive	60	48
⅜ to 12 inch, inclusive	67	55

Coke.—The *Courier* reports the output of Coke in the Connellsville region last week as exceeding 250,000 tons, for the first time in the history of the region. Including the output of the lower Connellsville region, production last week was very close to 300,000 tons. The car supply is very good and Blast Furnaces and other consumers are getting Coke as fast as needed. Connellsville Furnace Coke is $2.25 to $2.50 a ton on contracts, but for spot Coke as high as $3 to $3.50 is being offered. Foundry Coke is $2.75 to $3 a ton on contracts.

Scrap.—We note a fair demand for Old Material, but a good many large consumers are covered and are out of the market. Heavy Melting Stock for Bessemer and open hearth purposes is $20.50 to $21 in gross tons. No. 1 Railroad Wrought Scrap is $22 in net tons. Rerolling Steel Rails are $22 in gross tons; No. 1 Cast Scrap is $18 to $18.50 gross tons; Wrought Turnings, $14 net tons, and Cast Borings, $14 gross tons. Iron Rails, rolling mill lengths, are held at $27 to $27.50 in gross tons.

Cleveland.

CLEVELAND, OHIO, June 17, 1902.

Pig Iron.—The dealers in Foundry grades have announced that during the past week sales have been made which entail deliveries into the first quarter of next year, while other sales indicate that the supply for the third and fourth quarter of this year has been materially lessened. Delays to the furnaces have been a constant and an increasing factor. Some of the furnaces in the Valleys have been retarded longer in making their repairs this year than usual, coming on top of which was the week's banking of fires due to the strike, and as an outgrowth of which came the production of off Irons for three days of the last week while furnaces were getting back into shape. One furnace is said now to be 15,000 tons behind her contract, and others are in a bad plight, although not in such condition as is indicated by such a statement. The condition of the furnaces being understood much of the Iron which was offered on the market a week ago for third and fourth quarter delivery has been withdrawn, and there is now no assurance that any more Foundry Pig will be available during that period. This has forced the buying for next year's Iron, which is being done on a very large scale, amounting in instances to the total production of certain furnaces. On these advanced sales the price has been held well up, the quotations being $22 in the Valleys for No. 1 and $21.50 for No. 2, which brings the quotation about back to 1900 times when the big boom was on. In Bessemer and Basic there is no Iron offered either for immediate shipment or for third and fourth quarter delivery at any price. The Bessemer Association held an informal meeting during the last week but did not come to an understanding as to future prices. The recent action of Finished Steel makers seems to indicate that they look for a continuance of present prices on that material. The belief of the members of the Bessemer Association is that such calculations are not well based. Just what the future prices of Bessemer will be they will not endeavor to say, but the general understanding is that there will be an increase over present quotations. There have been no sales, therefore, by members of the association of recent weeks, and while there is a possibility of a sale soon to the larger Steel makers the date and the extent of it are as uncertain as is the price at which the material will be sold. The immediate supply of Bessemer is short. The recent curtailments of production have about removed the possibility of any material finding its way upon the market before the year is out. Under the circumstances any apt quotations of prices would be impossible. Almost identically the same condition obtains in the Basic market and no quotations of any kind are heard.

Finished Material.—This week in the Finished Steel trade has been characterized by the sale of material into the second quarter of next year, and by the development that the heavy specification on present contracts will necessitate more buying before the year is out. The Plate trade has been one of the factors which leads in interest, and especially as it enters into the shipbuilding industry. The shipbuilders here have been pushed for material to such an extent that some orders were refused. Later on the American Ship Building Company, being under necessity to continue operations to meet the urgent demands of customers, sent abroad and bought large quantities of both the larger Plates and the Structural Shapes needed for the skeletons of the ships. This foreign order has been augmented by advance sales here of several thousand tons of the same material that has been ordered for use in filling the same contracts. This advanced order marks the first sale of Plates in this district entailing deliveries past the first of the year and also adds to the Structural Steel tonnage for first-quarter delivery of next year. The price on the Plates has been held at identically the same figure that has been maintained during the present year. The intermediate grades between Plates and Sheets are very hard to obtain. Any one having 3-16-inch Plates can about command his own price for them now, the market being anxious and the material short. The price would probably range about 2c. In the Sheet trade the market is active. There is a good call for material, but so is there a lively supply of it, and the market is in a most healthy condition. The prices have not changed in the least of late, being still 2.50c. for No. 10 as a basis on the gauges between 10 and 16 and 3.50c. to 3.60c. for No. 27 as a basis on the gauges between 17 and 28 for one pass cold rolled, full cold rolled bringing 10c. extra. In Structural Steel the sales have not only taken up the entire supply for the first quarter of next year, but sales have actually been made into the second quarter, and the tonnage covered has been of a considerable amount. The mills have generally asked and received 1.70c., Cleveland, on Structural Steel for second-quarter delivery of next year. Bar sales have been more quiet this week. Large rounds are very hard

to obtain, and if they could be obtained the market would be represented by a quotation of about 2c. The other grades are more plentiful and the association prices prevail. There is some talk of shading the prices of Bar Iron, but this comes from the West, and mostly the association price holds here. The quotations, therefore, are 1.60c., Pittsburgh, for Bessemer Steel Bars; 1.70c., Pittsburgh, for Open Hearth Steel Bars, and 1.80c., Pittsburgh, for Bar Iron.

Old Material.—The market has been steady this week, with no startling changes in the situation. The sales have been made in large numbers, although the amounts have been comparatively small. There has been no change whatever in the quotations, which remain as follows: No. 1 Wrought, $19.50 net; Iron Rails, $27.50 gross; Iron Axles, $26 net; Cast Borings, $10 gross; Wrought Turnings, $15.25 gross; Cast Scrap, $16; Car Wheels, $19 gross; Heavy Melting Steel, $19 gross; Old Steel Rails, $20 gross.

French Iron Market.

PARIS, June 1, 1902.

It appears as though indecision is to characterize our metallurgical market. May has not been a favorable month for business, and all that can be expected for the present is that prices remain until a more lasting upward movement becomes manifest in the industry. In Paris proper Merchant Bars are still quoted 16.50 francs, while Beams are quoted 17.50 francs, base. Merchants, however, who see their stocks increasing do not adhere to these prices closely, and sell below them when they see an opportunity to do so with effect; thus last week a lot of 200 tons of Bars was sold at 16.25 francs. This year building is not coming up to expectations, and if it were not for the orders received from the colonies there would be no doubt as to a declining market.

Furnaces in the Meurthe and Moselle districts are in a fairly satisfactory condition. A good run of orders is secured by the Comptoir Metallurgique de Longwy, who quote 68 francs for Basic Pig, 70 to 71 francs for No. 3 Foundry and 66 francs for Mill Iron. In that district Bars are selling at 16 francs and Beams at 17 francs, there being a fair amount of business. Among the orders placed recently were 600 tons of Pipe secured by the Société d'Aubrives Villerupt. The Northern Railroad is on the market for 7200 Car Wheels to be delivered September, 1902, to March, 1903. In the Ardennes district no incidents have occurred to modify the course of events, and business remains quiet. At their meeting, held May 12, the rolling mills have decided to maintain the price of Bars at 16 francs for moderate lots and 15.75 francs for larger transactions, for deliveries up to four and five months. Scrap Iron is readily sold at 65 francs per 100 kg.

In the northern department the situation has remained unchanged. The mills are receiving specifications quite regularly on old orders. The merchant trade is very light. The fact that prices remain firm in spite of the light flow of orders is, according to opinions expressed at the last meeting at Aulnoye, a valuable indication of better things to come. It was therefore decided not to yield to the pressure of middlemen and to adhere to 16 francs as the base price on Bars without any restrictions. The forges of the Haute Marne district, although not in a better position than those of the adjoining districts, have issued circulars announcing an advance of 50 centimes on all Bars and Hoops. It must be admitted, however, that these prices have not led to orders, and the quotation of 17 francs does not seem justified by the state of the business. Sheets are in good demand at 19 to 19.50 francs for Iron Sheets and 20 to 20.50 francs for Steel Sheets. Wire Nails and Wire products are in a good position. For certain lines there is even an abundance of orders. Prices are: For Drawn Wire, 21 francs; for Nail Wire, 22 francs, and Galvanized Wire, 25 francs; Wire Rods, 18 to 18.50 francs.

In the Loire district and in the center of France order books are not in a particularly good condition. Still prices for Merchant Bars are well held at 19.50 francs. Plates are quoted at 23.50 francs for Iron 3 mm. and upward, and 24 francs for Steel 3 mm. and upward, base.

Our foreign commerce is indicated by the following figures for the first four months of the years 1902 and 1901. In Iron Ore we have imported during the first four months of 1902 526,400 tons, as compared with 547,400 tons in the first four months of 1901. Our exports during that time were 94,100 tons in 1902, as compared with 100,000 tons in 1901.

There has been a sharp decline in the imports of Pig Iron and an increase in the exports, as is shown by the following table:

	First four months.			
	Importations.		Exportations.	
	1901.	1902.	1901.	1902.
Foundry and Mill Iron	27,250	9,857	23,244	66,417
Ferromanganese and Ferro-silicon	1,750	2,756	151	315
Totals	29,000	12,613	23,395	66,732

The imports of Finished Iron were 15,673 tons in the first four months of 1901, as compared with 7062 tons for the corresponding period of 1902. The exports were 10,450 and 14,000 tons respectively. The movement in Steel was as follows: Our imports during the first four months of 1901 were 3860, while this year they have fallen to 1680 tons. Our exports, which were 13,600 tons in the first four months of 1901, have risen to 38,500 tons in the first four months of 1902.

New York.

NEW YORK, June 18, 1902.

Pig Iron.—The scarcity of Pig Iron has been aggravated, so far as this territory is concerned, by the Anthracite Coal strike, which has forced a number of furnaces in the Schuylkill and Lehigh Valleys to bank, and has been increasing the percentage of off Iron made by those which have continued in operation. Sellers are at their wits ends to meet the requirements of their customers, and some are parceling out small importations of Scotch Pig. One leading consumer in the market is reported to have imported direct a lot of 1000 tons of a leading Scotch brand. There is some inquiry for 1903 delivery, but except in those cases in which usual contracts for a whole year's requirements are closed little appears to have been done. Some of the leading makers are discouraging buying at present prices for 1903 delivery, while others are willing to book some orders close to the present range. Quotations for summer delivery are as follows: Northern Iron, at tidewater, No. 1 X, $22.50 to $23; No. 2 X, $21.50 to $22; No. 2 Plain, $21 to $21.50. Tennessee and Alabama brands are quoted as follows: No. 1 Foundry, $21.75 to $22; No. 2 Foundry, $20.75 to $21.25; No. 3 Foundry, $20.25 to $20.50.

Cast Iron Pipe.—The inquiries for small and moderate sized lots continue so numerous and urgent that the shops are filled to overflowing. Those in the Eastern district are, besides, suffering from a scarcity of material.

Steel Rails.—No sales of any magnitude are reported this week for 1903 delivery.

Finished Iron and Steel.—There is increasing scarcity of Structural Material, and prices are stiffening further. Considerable quantities of foreign Beams and Angles are being imported, but there is some complaint concerning the character of the material. Among the larger contracts about to be closed for the city is a large theater. We quote at tidewater as follows: Beams, Channels and Zees, 2c. to 2.25c.; Angles, 2c. to 2.25c.; Tees, 2c. to 2.25c.; Bulb Angles and Deck Beams, 2.10c. to 2.25c.; Sheared Steel Plates are 2c. to 2.10c. for Tank, 2.10c. to 2.20c. for Flange, 2.25c. to 2.40c. for Fire Box. Refined Bars are 1.95c. to 2c.; Soft Steel Bars, 1.95c. to 2.05c.

The Ironsides Company, Columbus, Ohio, advise us that their latest acquired additional specialty, the Ironsides Tormay oiler, is being rapidly adopted by the principal plants of the country and that the general demand has taxed its facilities.

Metal Market.

NEW YORK, June 18, 1902.

Pig Tin.—A sharp decline set in at the beginning of this week as a result of the heavy arrivals here and a sharp break which occurred in London and continued up to this writing. The London prices have declined £4 in two days, and since the first of this month spot has declined £8 and futures £10. The reason given for the sudden drop in London is that the manipulators there have found out that America will not be a supporting power in the future. Consumers here are well supplied, and the time of the year for the closing of mills for repairs is close at hand. Shipments from the Straits for the first half of this month were very large, being 500 tons greater than for the same period of last year. It is expected that they will continue on a heavier scale for some time to come. The market closed as follows: Spot, 28.75c. to 29.25c.; June, 28.35c. to 28.75c.; July sellers at 28.25c.; August sellers at 27.50c.; September sellers at 27c.; London spot, £127; futures, £121 5s.

Copper.—The market has been extremely dull, with prices declining daily. Consumers are not buying, evidently in anticipation of the summer shut down and in view of the fact that their previous purchases have been rather heavy. The sharpest decline in this market was noticed in Lake, which several days ago was sold by producing interests at 12½c. for this month's delivery, and which since has been offered at this figure for any delivery during the balance of this year. Electrolytic sold as low as 12.20c., and was then freely offered at that price. The closing quotations to-day are as follows: Lake, 12c. bid, 12.47½c. asked; Electrolytic and Casting, spot to September, 12c. bid, 12.12½c. asked. Standard, spot to September, 11.50c. to 11.80c. The London market declined £1 since yesterday, and still shows signs of weakness. Closing prices to-day were as follows: Spot, £53 5s.; futures, £53 10s.; Best Selected, £58 10s.

Pig Lead.—There is no change to be noted. The Smelting & Refining Company quote Desilverized on a basis of 4.12½c. spot and 4.10c., 15 days, New York delivery. The London market has declined 2 shillings and 6 pence to £11 5s.

Spelter.—The market is still firm at 4.87½c. for spot. Only a small business is reported. Shipments for next month are quoted at 4.75c., and the St. Louis market is 4.60c. The London market has advanced 2 shillings and 6 pence, being quoted at the close to-day £18 15s.

Antimony—Is unchanged. Hallett's is quoted 8c. to 8¼c.; Cookson's, 10¼c., and outside brands, 7½c.

Nickel.—The situation is unchanged. Ton lots are quoted at 50c.

Quicksilver.—Prices are on a basis of $48 per flask of 76½ lbs. in lots of 56 flasks or more.

Tin Plates.—The market is unchanged. The American Tin Plate Company are quoting for delivery until October 1 on a basis of $4.19 per box of standard 100-lb. Cokes, f.o.b. New York, or $4, f.o.b. Pittsburgh. Quotations from Swansea show a decline of 1½ pence to 13 shillings 6 pence.

John Stanton reports the Copper production in the United States and of the foreign reporting mines and United States exports as follows, in gross tons of 2240 lbs.:

	Reporting mines.	Outside sources.	Total U.S. product.	Product foreign mines.	U. S. exports.
First half 1895....	70,612	9,100	79,712	42,484	34,215
Second half 1895..	84,885	6,600	91,485	43,674	30,507
Total 1895.....	155,497	15,700	171,197	86,178	64,722
First half 1896...	94,180	7,200	101,380	42,255	58,216
Second half 1896..	95,314	7,200	102,514	43,941	67,287
Total 1896.....	199,494	14,400	203,894	86,196	125,503
First half 1897...	103,651	5,000	108,651	44,263	64,870
Second half 1897..	100,555	6,900	107,455	44,007	64,340
Total 1897.....	204,206	11,900	216,106	88,270	129,210
First half 1898...	112,687	7,800	120,487	40,886	68,284
Second half 1898..	103,535	10,250	113,785	43,674	76,831
Total 1898.....	216,222	18,050	234,272	84,554	145,115
First half 1899...	111,987	12,500	124,487	43,629	56,460
Second half 1899..	118,818	18,900	137,719	45,611	63,351
Total 1899.....	230,806	31,400	262,206	89,240	119,811
First half 1900...	114,177	20,400	134,577	43,153	90,747
Second half 1900..	113,810	20,400	134,104	46,278	63,335
Total 1900.....	227,987	40,800	268,681	89,431	160,082
First half 1901...	112,794	20,600	133,394	46,847	50,027
Second half 1901..	110,561	21,300	131,861	53,394	44,339
Total 1901.....	223,355	41,900	265,255	100,241	94,366
January, 1902....	15,155	3,800	18,955	7,367	15,021
February, 1902...	16,931	3,400	20,331	8,475	16,108
March, 1902.....	20,335	3,700	24,035	8,979	20,097
April, 1902.....	20,824	3,800	24,624	10,169	16,424
May, 1902.....	21,763	4,000	25,763	9,354	16,283

Iron and Industrial Stocks.

The event of the week has been the granting of an injunction against the carrying out of the United States Steel conversion plan, which will come up for a hearing at an early date. Nothing authoritative has been issued concerning the intentions of the managers of the corporation, although the report has been given currency that the issuing of the additional mortgage of $50,000,000 is to be proceeded with. The iron trade is particularly interested in this because it affects the question how soon a number of important improvements to plants are to be started. We have not been able to obtain any official information on this point, but quite recently the statement was made that the final decision as to the exact character and extent of some of the betterments would be settled as the result of a trip which the leading officials expected to start on next week.

Among the most active of the industrial stocks has been Car & Foundry, which has displayed a further advance. Cambria Steel, too, has shown some activity lately. A report is current that negotiations are under way for the purchase outright of the plant of the Thomas Iron Company by a syndicate.

Shelby Iron Company.—The pamphlet report of T. G. Bush, president of the Shelby Iron Company, for the year ending March 31, 1902, shows a net profit for the year of $127,498.77, of which $118,336,96 was profit on pig iron. There were written off for depreciation $6550, leaving $120,948.77. The balance on April 1, 1901, was $131,437.85, and there were paid in dividends $120,000, leaving a balance of $132,386.62. The furnaces made 33,241 gross tons of pig iron, and there was shipped 42,346 tons and used in foundry 121 tons, thus reducing the stock from 9274 tons to 48 tons. The available assets amount to $323,554.06, including $196,214.66 cash and $80,016.51 accounts receivable for pig iron shipped. The accounts payable were $15,139.19, leaving net available assets of $308,414.87. The inventory of lands shows $289,582. During the year two dividends were paid, one 5 per cent. and one 7 per cent., in the months of April and November. A further dividend of 10 per cent. was paid on May 15, 1902. The capital stock is $1,000,000.

Dividends.—The International Steam Pump Company have declared the regular quarterly dividend of 1½ per cent. on their preferred stock, payable July 1. Books close June 20 and reopen July 2. A dividend of 4 per cent. for the year has been declared on the common stock, payable in four quarterly instalments.

The Boston Belting Company have declared a regular quarterly dividend of $2 per share, payable July 1 to stockholders of record June 14.

The Crucible Steel Company of America have declared a regular quarterly dividend of 1¾ per cent. on their preferred stock, payable June 28. Books close June 16 and reopen June 30.

The American Iron & Steel Mfg. Company have declared a dividend of 1¼ per cent. on their preferred stock, payable July 1, as registered June 24.

The Westinghouse Machine Company of Pittsburgh have declared a dividend of 1½ per cent., payable July 19.

The Wheeling Steel & Iron Company, Wheeling, W. Va., have declared a regular quarterly dividend of 2 per cent., payable June 30.

No Crucible Steel Combine.—PITTSBURGH, PA., June 18, 1902.—The report that C. H. Halcomb, who recently resigned as president of the Crucible Steel Company of America, would organize into one company three or four of the independent crucible steel plants in the Pittsburgh district is officially denied. Two of the concerns reported interested in the proposed combine deny any connection with it whatever.

The New York Machinery Market.

NEW YORK, June 15, 1902.

Important developments are transpiring in the machine tool trade. As noted in this column last week the principal lathe builders are endeavoring to arrive at a concerted action in advancing prices. The six largest builders of radial drills have already gotten together and adopted a new price-list.

On Thursday morning last a meeting of all the prominent lathe builders of this country, with the exception of one large company, was held at the Waldorf-Astoria Hotel. All information regarding the action of the meeting was withheld from the public. Facts have leaked out since, and such as we have been able to gather from reliable sources in the trade show that a decision favorable to a general advance was arrived at. It is said that 28 of the lathe builders present signed an agreement to advance prices 10 per cent. A committee was appointed to obtain the present price-lists from the builders and issue the new lists. One report has it that the new prices will be sent out, to take effect next Monday. In other quarters it is stated that the advanced prices will not become operative until July 1. It is said that the 28 builders who signed the agreement include all important makers, with the exception of one large concern, whose offices are in New York, and who, it is expected, will also advance their prices, although they will not become parties to the agreement.

With the lathe builders there were also representatives of the six prominent builders of radial drills. They decided upon similar action, and have already issued their new price-list, which notes a general advance amounting to 10 per cent. in some instances, and on other makes a slightly smaller increase.

While in all quarters of the trade the opinion is expressed that conditions warrant an advance, the present arrangement does not meet with the entire approval of all concerned. The New York representatives of the concerns involved state that under the new prices they will not feel justified in ordering large lots from the builders in anticipation of future orders, as they have been doing during the last few years. In some quarters of the trade it is felt that the increase in price of raw materials is the only excuse that can be given for an advance in tools. The general demand for machine tools, while good, is not as great as it has been for the last year or so.

In the engine trade several important contracts have just been placed. The New York Edison Company ordered two Westinghouse-Corliss three-cylinder compound engines from Westinghouse, Church, Kerr & Co. for installation in their new "Waterside" Station, New York. These engines will be of 5500 nominal horsepower, with an ultimate capacity of 8000 horse-power each. They will be similar in capacity and construction to the eight vertical Westinghouse engines which form the initial installation in this plant.

Woolston & Brew of 39 Cortlandt street captured the Jersey City, Hoboken & Paterson Street Railway engine order. This contract calls for three Brown-Corliss vertical cross compound condensing engines of 2750 horse-power each. They will be installed at Hoboken, and are each to be direct connected to a 1500 k.w. General Electric generator. They will be duplicates of the engines which Woolston & Brew recently sold to the North Jersey Traction Company for installation in their Newark plant, and which will also be built by the new Brown-Corliss Engine Company of Milwaukee.

Westinghouse, Church, Kerr & Co. also received the Springfield Railway Company's order of Springfield, Mass., which called for a 3000 horse-power vertical compound engine.

The Rapid Transit Subway Construction Company of New York have placed an order with the Allis-Chalmers Company of Chicago for two combined vertical and horizontal Reynolds Corliss engines, cylinders, 42 and 86 x 60 inches. Recent sales of the Allis-Chalmers Company also include a vertical long cross head blowing engine, steam cylinder, 42 x 60 inches; air cylinder, 84 x 60 inches, to the Buffalo Union Furnace Company, Buffalo, N. Y., and one 14 x 36 inch and four 18 x 42 inch girder frame Reynolds Corliss engines to the Southern Cotton Oil Company, New York City.

Woolston & Brew obtained an order from the American Sugar Refining Company of Jersey City for a 300 horse-power vertical compound Ball engine, to be direct connected to a Westinghouse alternator.

The Woonsocket Electric Light & Mfg. Company of Woonsocket, R. I., bought a 3000 horse-power horizontal cross compound Westinghouse engine.

McClave, Hamilton & Co. of 85 Liberty street closed an order for the third 160 k.w. generating set, to be installed by the American Tube & Stamping Company of Bridgeport, Conn.

The Washington-Annapolis electric railway deal, which has been held in abeyance for several years, is now up again.

The Ruggles-Coles Engineering Company of 39 Cortlandt street are in the market for the entire mechanical equipment for a 500-barrel cement mill, which is to be erected at Sharon, Pa., by the Stewart Iron Works, who are to convert their furnace slag into cement.

The Continental Tobacco Company of 111 Fifth avenue, New York, advise us that they will erect a new plant at Richmond, Va., and are in the market for a 400 horse-power direct connected engine and four boilers of 200 horse-power each. They will also require a complete equipment of improved tobacco machinery for manufacturing plug and smoking tobacco. W. H. McAlister, the secretary of the company, is in charge of the work.

Morgan Engineering Company Strike Settled.—PITTSBURGH, PA., June 18, 1902.—The strike at the plant of the Morgan Engineering Company, which has been in existence for three or four months, has been settled. The issue at stake was the reinstatement of an insubordinate union man who was discharged, recognition of union, placing the plant under union rule, time and one-half for overtime and nine hours per day. The firm conceded nine hours and time and one-half. They were paying time and one-quarter, working 55 hours per week, a concession of ten minutes per day. The union conceded to the firm the right to discharge and hire whom they saw fit, and also to run an open shop. The present non-union men are to remain in the employ of the firm.

The Chicago Pneumatic Tool Company.—At a meeting of the directors of the Chicago Pneumatic Tool Company, held in New York last Monday, it was decided to exercise the option recently given by the International Pneumatic Tool Company, Limited, of London. The terms of the option were discussed, and it was decided to accept the terms, but no formal acceptance has been forwarded to London as yet. Thomas A. Aldcorn of the Chicago company is now in Europe. It is said that the purchase of the English concern will be paid for by the issue of $200,000 treasury stock. E. N. Hurley resigned from the Executive Committee, and W. D. Calhoun of Chicago was elected to succeed him. The other members of the Executive Committee are Charles M. Schwab, Max Pam, C. H. Mathiessen, J. R. McGinley and J. W. Duntley.

The Pottsville Iron & Steel Works.—The Pottsville Iron & Steel Works at Pottsville, Pa., have been purchased by a syndicate of New York capitalists, who will prepare it for active operation with the utmost speed possible. An outlay of not less than $500,000 will be made to place the plant in a thoroughly up to date condition, by which they expect to turn out 80,000 tons of structural material per annum. A large addition will be made to their bridge shops, and at least one of the furnaces will be remodeled, so that they will be able to make their own pig iron. Work on the plant has already commenced, and it is believed that it will be completed before the snow flies.

HARDWARE.

THE recent attempt to form a consolidation of Hardware jobbing houses has been productive of at least one effect—it has set free a flood of speculation as to what would have resulted had the project proven successful; whether or not it would have been possible for such a coalition to prosper had the formation of the giant company been completed, and the changes in the trade which would have resulted from the introduction into distribution, and possibly into manufacture, of the new force. There has certainly been a good deal of questioning as to the causes which influenced the houses supporting the movement to consent to lose their painfully acquired trade identity, and to exchange the esteem and good will gained by long and honorable service for a share of the uncertain honors and profits of a huge corporation.

That the Hardware jobber is dissatisfied with the present condition of things is plainly evident from the complaints he makes in the press and in convention, and in his daily correspondence with the makers of the goods he sells. He is not satisfied with his margins; he objects to the mail order houses and racket stores; he finds competition with his brothers in trade growing uncomfortably keen, and last, but not least, he complains that the manufacturer sells his customers and ruinously cuts into his trade.

It is more than possible that in this last cause for complaint lies the jobber's greatest grievance against the present tendencies of trade. Many of the retailers who ten years ago depended solely upon the jobbers for supplies have grown to a point where the amount of their purchases warrants them in expecting better prices than the jobber is able or willing to give. The rapid development of the country and the growth of the large towns into cities have created a larger trade, and in many lines of goods the orders have grown to case lots, making it possible to buy direct from the makers and eliminate one profit. The county seats, as well as many other towns in the Middle, the Southern and the Western States, have almost universally one or more large retail Hardware houses of this kind, and the manufacturer, too often for the jobber's peace of mind, finds their claim for consideration tenable. Many times the jobber discovers that a former customer is buying a given line as low as he is. Perhaps the manufacturer makes the same price to both, allowing freight to the jobber and selling the retailer f.o.b. factory, or makes a difference of only 10 or 15 per cent., which barely covers the jobber's selling expense.

And this selling expense is climbing. Every long established jobber finds that his big accounts are dwindling, and that he must seek by an increased number of smaller accounts to balance the loss in his larger trade. So he works his territory closer, sending his men into towns he formerly passed by as too small. Thus his ratio of expense keeps creeping up. Notwithstanding his complaints to manufacturers, there has been no redress and he has had to accept the situation with what grace he may. Probably the prospect of being able to exert a powerful influence upon manufacturers and control their methods of selling was a potent factor in securing the favor of the parties to the proposed combine.

The announcement made in another column in regard to the organization of what is termed an export club is an illustration of the intelligent and enterprising spirit in which our merchants and manufacturers are reaching out for foreign trade. It is another indication that this country is thoroughly in earnest in seeking to extend its commercial relations with the world at large. From the statement made in regard to the lines on which it is intended to prosecute the work of promoting the sale abroad of American products it will be seen that the diffusion of information holds an important place. The club will aim to give foreign houses who desire American goods advices as to the parties from whom they may be advantageously obtained, calling their attention primarily at least to such manufacturers as are members of the club, a feature which is undoubtedly expected to attract manufacturers to the organization. If the club should assume large proportions it is obvious that there would be a call for exceptional skill and judgment as well as impartiality in giving information to the buyers, and also to the houses in this country who are in a position to supply their needs. One direct effect of the effort will apparently be to bring the foreign houses and the American makers of goods into close relationship, a matter which on general principles is very desirable. This feature of the plan will possibly be regarded with some disfavor by some of the commission houses, who are reluctant to have their customers brought into direct contact with the manufacturers in this country, but many of the commission houses and those who are most progressive and successful take a broader view of the question and are disposed to welcome any influence which diffuses information in regard to facilities here for the supply of foreign markets. The need of the dissemination of such information in Spanish-American countries is especially urgent, and as this is a field to which the Export Club are primarily and principally turning their attention, whatever they do in bringing the products of our manufacturers to the knowledge of their buyers will be regarded as a substantial contribution to the good work of occupying the world's markets. The club is, however, something of an experiment, and its operation and development will be watched with interest.

Condition of Trade.

In the midst of the continued pressure of current business there are many indications of the presence of the summer months, when trade relaxes its demands and the activities connected with the producing and the marketing of goods are perhaps as much interrupted as at any time in the year. The manufacturers are preparing for the stoppage in whole or part of their factories for the purpose of making repairs, overhauling machinery and perhaps increasing their facilities. The pressure of business, therefore, is such that there will not be any longer interruption of production than is necessary, and some of the manufacturers will gladly avail themselves of the opportunity to repair broken stocks and accumulate something of a supply for the fall business. This is a season when the orders from the large trade are light, many buyers having already placed orders to cover their requirements. Labor agitations will probably attract some attention, and business is already somewhat disturbed by the coal strike, both in its interference with the supply of fuel and in the restlessness which is connected with it. Wages in many lines in which skilled workmen are employed are higher than a year ago, and the tendency is gradually upward. This fact, with the

condition of the market in the raw material, gives firmness to prices. Many kinds of heavy goods are decidedly scarce and held at high figures. Trade throughout the country is moving along in excellent volume. The promise of the crops is such as to cause no general solicitude, with a good prospect that their abundance on the whole will lay a foundation for continued good times. One penalty of the prosperity which prevails here, with its natural accompaniment of high prices, is the falling off in the volume of exports in certain lines. While some manufacturers are wise enough to take a broad view of the situation and take care of foreign business even to the neglect of some urgent calls from the home market, others are apparently sacrificing their interests in export trade, as they are failing to make the most of connections already established with foreign houses. A wiser policy, however, prevails in the counsels of others, and in general it is to be said that manufacturers are using enterprising and energetic measures to extend their trade relations in the markets of the world.

Chicago.

(By Telegraph.)

The situation as far as Wire Nails are concerned has improved during the week. Three or four of the largest independent mills have either closed down or reduced their output, and whatever disposition there may have been to cut prices among the trade has been dissipated. The demand, too, has been unexpectedly active, and mills that anticipated accumulating supplies have been surprised in disposing of the current make, the result being a decidedly more confident and firmer feeling throughout the market. The demand for Wire, too, has been especially good for this season of the year, and a firm tone has characterized the market. The demand for Tacks has been somewhat improved, and a little better feeling has been noted in this line, created by the advance of 10 per cent. which took place some weeks since. In the line of Builders' Hardware activity has continued the most prominent feature, a number of new orders having been received and quite a number of important contracts are pending. Prices are very firm, with no disposition shown to induce trade by cutting prices. In fact, the tendency seems to be in the other direction, and even some of the poorer grades of goods are being strengthened. The demand for Tools has kept up remarkably well, and prices have not only been steady but firm. The recent advance in Chisels and Squares seems to have made no difference in effecting sales. The aggregate volume of business in Shelf Hardware and special lines has continued liberal for this season of year, although there is a natural falling off in the number of orders placed. From retailers comes the information that the summer trade is more than usually active, but jobbers have naturally experienced a less active trade in what may be termed the summer line of goods. In Heavy Hardware lines, while there is less pressure, there has been considerable activity, especially in Bars, Channels and other Shapes, Tires and various other kinds of wagon material. Most encouraging reports are being received from all sections dependent upon this market for supplies. The crop outlook in the winter wheat belt, in the spring wheat and flax district, the cotton sections and in the corn States is uniformly encouraging. Some of the largest Hardware interests have recently made a canvass of crop conditions, and without exception replies have been usually favorable, with a very large volume of business anticipated during the fall.

St. Louis.

(By Telegraph.)

The general movement of goods in the Hardware market since the beginning this month has been along lines satisfactory to the jobbing interests at this point, and it is remarked that the usual slackening tendency noticeable at this time of the year is less pronounced than has been the case heretofore. The general opinion among the leading interests concerning the outlook for fall trade shows a feeling of confidence, and the plans for caring for these future demands are along more liberal lines than in the past. Most favorable reports concerning the crop outlook continue to come in from traveling representatives, and this factor more than any other shapes the course of future market conditions. Aside from Shelf Hardware, Carpenters' Tools and other lines required in building operations, the present demand includes all sorts of summer specialties, such as Refrigerators, Ice Cream Freezers, Lawn Mowers, Garden Tools, &c. The heavy department of the market continues to handle a very fair volume of business, and in the matter of prices a firm tendency is to be noted on all lines.

Baltimore.

CARLIN & FULTON.—The conditions of business are so closely allied to those of the weather that we must be pardoned for introducing the latter topic so frequently into letters which are supposed to discuss merely the question of trade. The activity of our market depends very largely on agriculture and has this season been very greatly interfered with by a drought which has prevailed here several weeks, but which we hope is now broken. The farming community complains that the grass crop will amount to nothing and that the wheat crop will be exceedingly short, and the result has been already in our city markets extremely high prices for nearly every article of food, making the full dinner pail rather a luxury.

In such sections as have been affected by the failure of crops it is hard work to convince the average buyer that his troubles are mostly local, and that there is an immense demand for goods, a shortage of transportation facilities, a great scarcity of raw material, a great lack of manufactured goods, that the factories are months behind in their shipments, that the prospects are for higher prices, and that the world is much bigger than his horizon. The buyer wonders sometimes whether all this so-called activity is the result of business or manipulation, and whether if all the productive capacities of the mills were put into operation they could not catch up with orders and supply the demand.

That there is an immense distribution of goods admits of no doubt, and prices are well sustained, and, in fact, can and will be in many cases made higher. Cut Nails, instead of being driven out of the market entirely by the Wire Nails, seem to be in greater demand, and ask no odds of their competitors as to price; in fact, Cut Nails are more difficult to obtain than Wire Nails.

After the experience of the last few years in the delay attending the shipment of all seasonable goods it is to be hoped that the trade will not wait until the very last minute for the goods needed during the fall, but will anticipate those wants and relieve the factories of the pressure when the season is at its hight. It is not merely that the manufacturers cannot always ship at sight, but even when shipments are made the railroads now require about twice the length of time that they did in former years to make their deliveries. It is, however, an old story to the trade generally, and no matter how oft repeated, the tendency is to frequently wait until the last moment and then wonder why goods are difficult to obtain.

Philadelphia

SUPPLEE HARDWARE COMPANY.—At this writing we are in the midst of a very heated term, which is not an incentive to vigorous working, but does create a demand for Window Screens, Screen Doors, Wire Cloth and goods of that nature. Screens and Screen Doors being bulky articles it is a somewhat difficult problem to unload carloads of these goods, arrange for reshipment, bring them into warehouse and again reship, which, when the expense is figured, always shows, of course, a very small margin of profit. This is probably the case this season more than in former years, as the profit in handling them is infinitesimally small. The Lawn Mower season has extended over a greater number of months, with orders for high grade probably in excess of any former year, and lower grades are being pretty generally relegated to catalogue houses and department stores.

The miners' strike continues with all the bad effects, first to the operators, more especially to the workmen and naturally, incidentally, to the traders in the various sections where the strike was inaugurated and is continued. Trade in these sections has become quite depressed.

Collections are only fair, as is usually the case in the midsummer months.

Omaha.

LEE-GLASS-ANDREESEN HARDWARE COMPANY.—With regard to trade, the situation could hardly be more encouraging. Reports from all sections of tributary territory indicate crops in general as doing well, and giving promise of an abundant harvest. Under the stimulant of plenty of moisture, both grass and grain show growth of the healthiest kind. As cattle have of late been very profitable to farmers and stock raisers, the abundance of feed in sight is a very gratifying condition.

General conditions, as they exist at present, could not be materially improved. The constant and heavy demand for merchandise of all kinds continues unabated and there is nothing appearing in the present, or even the future outlook, that would tend to a suspicion of a retrograde influence from the satisfactory volume of business that has been inaugurated since the first of the year.

Portland, Oregon.

CORBETT, FAILING & ROBERTSON.—It has been a case of *veni, vidi, vici* in the assembling of the Travelers' Protective Association in their national annual meeting in our city the past week. The attendance has been large and enthusiastic, assembling a body of hustling, rustling, energetic men that cannot be duplicated the world over. Portland feels honored that so large a body of up to date progressive men should select her for the annual meeting, we being located so far from their home and headquarters. However, the railroad of to-day joins hands with telegraph and telephone in annihiliating space. If they had been called on to make the trip by the Isthmus of Panama, as the writer was 47 years ago, to reach this place, we would have been counted out of it.

Trade continues in the same strong, even gait heretofore reported. We to-day have in our harbor four large Asiatic steamers, one of which took on a former occasion 4,000,000 feet of lumber and is now to load 750,000 bushels of oats for South Africa, the largest single cargo of oats floated, a record both in lumber and oats for the same steamer.

Weather is fine for maturing crops, and with the exception of prunes, all farm products will make a showing this fall that will be to the credit of the State and remunerative to its citizens.

Nashville.

GRAY & DUDLEY HARDWARE COMPANY.—This is the season of the year when we are not actively engaged in either spring or fall trade. It might be termed "between seasons." Most jobbers are just completing their inventory, salesmen as a general rule are getting posted for the fall campaign, and the jobbers generally are actively preparing for the fall trade.

As the crop prospects in the South continues good, we have every reason to expect that the fall trade will open early, and if the crop turns out as well as it now promises trade will certainly be good.

The retail Hardware business in the cities is excellent just at this time, especially on summer goods, such as Refrigerators, Ice Cream Freezers, Hammocks, Lawn Swings, Ice Tools, &c.

When inventories are completed and vacation season is over, we hope to be able to report that the merchants of the South are getting their full share of the Hardware trade.

New Orleans.

A. BALDWIN & CO.—We will evidently escape the usual midsummer dullness, as conditions show a decided improvement, and orders are coming in very freely. The continued drought is hurting in some sections, but we expect in a short time to report an improvement even in these localities.

The demand for Builders' Hardware is very flattering, and in a number of cases it is rather difficult to obtain supplies quickly enough.

Prices are firm in nearly all lines and collections are fair.

Louisville.

W. B. BELKNAP & CO.—Business is running on a good even keel, supplies are still rather short in heavy goods, and there is a little apprehension that they will be still more so when the active season of July, August and the fall comes on. May and June are notoriously the light months of the year in this part of the world, but it is rather apparent that stocks through the country are short, and if crop prospects continue as flattering as at present we may look for a heavy demand later on.

There is certainly more spending money in the country than there has been since the war. As one of our clothiers and men's furnishers expressed it, "It is less trouble to sell a $15 Panama hat now than it was to sell a $3 Mackinaw straw two or three years ago." The liberal class of buyers, too, come from the daily wage earners.

The railroad earnings continue to increase and everything is propitious except the coal strike. We may expect to see strikes more or less frequent as long as there is a demand like the present for labor and the products of labor. This is only natural and need not occasion any alarm on the part of pulpiteers or pamphleteers, who delight to dwell on the prevalence of what they style the "burning unrest," as though such a thing had never been heard of in the world. The sense of unrest is no more papable now that it was in the days of Peter the Hermit, but in that time there was no sensational daily journal with flaming headines to exploit the business. A healthy unrest is just what we want all the time to keep us from going to sleep and to keep us from being too contented with ourselves and our own small world. That "unrest," with the proper respect for the law, is the saving grace of our great American nation.

St. Paul.

FARWELL, OZMUN, KIRK & CO.—Conditions for trade in this territory continue favorable. June business compares satisfactoriiy with that of any previous year. Collections are good.

NOTES ON PRICES.

Wire Nails.—The prompt shipments which are now obtained from mills indicate that the demand for Wire Nails is not so pressing. In fact, orders are not being placed in nearly so large a volume as previous to the beginning of the month. Shipments on contracts placed some time ago are now being made. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

To jobbers in carload lots	$2.05
To jobbers in less than carload lots	2.10
To retailers in carload lots	2.10
To retailers in less than carload lots	2.20

New York.—Local business in Wire Nails is of good proportions, owing to the amount of building under way. The statement is made in the daily papers that there are 2365 buildings in course of construction in the Borough of Manhattan alone. The market is represented by the following quotations: Small lots from store, $2.30; carloads on dock, $2.18 to $2.20.

Chicago, by Telegraph.—The demand for Wire Nails has been unusually active, being quite a surprise to manufacturers, who had anticipated an accumulation of stocks. The high prices prevailing for iron and the tendency of steel products to advance may account for the liberal buying on the part of jobbers who are anticipating the future. Another factor which has contributed to the strengthening of the market has been the curtailment of production by three or four of the largest independent mills. The jobbing demand has been active, especially so for this season, but prices have

remained unchanged, single carload lots selling at $2.20 and small lots at $2.25 to $2.30 from store.

St. Louis, by Telegraph.—A fair movement is to be noted in Wire Nails and prices remain firm at the recent level. Carload lots are quoted at $2.25 and small lots from stock at $2.30.

Pittsburgh.—Demand for Wire Nails is dull and a few of the mills are somewhat short of orders. There is no trouble whatever in getting prompt deliveries, orders being filled as soon as received. The tone of the market is fairly firm, and it is hardly likely there will be any lower prices for Nails as long as steel and wire rods stay as high as they are now. In some cases differentials in prices on Wire Nails to jobbers and retailers are not strictly maintained. We quote Wire Nails at $2.05 in carloads and $2.10 in less than carloads, f.o.b. maker's mill.

Cut Nails.—The smaller demand for Cut Nails has relieved the situation somewhat, although there is still difficulty experienced in getting prompt shipments from mill of Iron Nails. Quotations are as follows, f.o.b. Pittsburgh, plus the actual freight to point of destination, terms 60 days, or 2 per cent. off in 10 days:

Carload lots	$2.05
Less than carload lots	2.10

New York.—Cut Nails are ordered in fair proportions by those whose trade demand them. Quotations for carloads and less than carloads are as follows:

Carloads on dock	$2.18
Less than carloads on dock	2.23
Small lots from store	2.30

Chicago, by Telegraph.—A firm tone has characterized the Cut Nail market with a good demand, unusually so for this season, and prices have remained firm at $2.30 for small lots from store. There is still some complaint respecting the tardiness of shipments from mill.

St. Louis, by Telegraph.—The demand and inquiry for Cut Nails is said to be in very fair volume and small lots from store are quoted at $2.40.

Pittsburgh.—There is still a good deal of trouble in getting Iron Cut Nails, and in many cases consumers have changed to Steel Cut Nails. There is a fair demand for Steel Nails, but less trouble in getting prompt deliveries than for some time. The mills seem to have caught up with back orders and are making prompt shipments. We quote Cut Nails at $2.05, base, in carloads, and $2.10 in less than carloads, f.o.b. Pittsburgh, plus freight in Tube Rate Book to point of destination.

Barb Wire.—The smaller demand for Barb Wire has permitted the mills to catch up with their orders. Shipments are made promptly, while the market is not referred to as being exceptionally strong. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. for cash in 10 days:

	Painted.	Galv.
To jobbers in carload lots	$2.60	$2.90
To jobbers in less than carloads	2.65	2.95
To retailers in carload lots	2.70	3.00
To retailers in less than carloads	2.80	3.10

Chicago, by Telegraph.—The demand for Barb Wire shows less falling off than had been anticipated, and there is still considerable activity in the filling of old contracts. The easier tone which has prevailed in the market for Galvanized Sheets does not extend to Barb Wire, which is selling at $3.10 for Galvanized, while Painted is steady at $2.80 in carload lots and 5 cents extra for small quantities.

St. Louis, by Telegraph.—While business in Barb Wire is on a lighter scale than heretofore, it is said to be well up to usual demands for this season of the year. In the matter of prices there is no change, and Painted is quoted at $2.90 and Galvanized at $3.20 in small lots from store.

Pittsburgh.—New business being placed is confined to small lots only, as the large buyers covered their requirements some time since. The tone of the market is only fairly firm, and in some cases slight concessions in prices are being made by a few of the mills. We quote as follows, f.o.b Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days: Painted, $2.60; Galvanized, $2.90; less than carload lots, Painted, $2.65; Galvanized, $2.95.

Plain Wire.—No change has taken place in the Plain Wire situation. Current business is only fair, while specifications on contract orders are being filled. Quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. for cash in 10 days:

Base sizes.	Plain.	Galv.
To jobbers in carload lots	$2.00	$2.40
To jobbers in less than carload lots	2.05	2.45
To retailers in carload lots	2.05	2.45
To retailers in less than carload lots	2.15	2.60

The above prices are for base numbers 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

6 to 9	Base					$0.40	extra.
10	$0.05	advance	over	base		.40	"
11	.10	"	"	"		.40	"
12 and 12½	.15	"	"	"		.40	"
13	.25	"	"	"		.40	"
14	.35	"	"	"		.40	"
15	.45	"	"	"		.75	"
16	.55	"	"	"		.75	"
17	.70	"	"	"		1.00	"
18	.85	"	"	"		1.00	"

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

Chicago, by Telegraph.—Compared with a year ago the demand for Plain Wire is more active, and mills are still from 30 to 60 days behind in completing old contracts. Under the circumstances the market continues very firm at $2.20 for jobbing lots from store.

St. Louis, by Telegraph.—The call for Plain Wire is said to be fair, and in the matter of quotation we note no change. Jobbers continue to quote No. 9 at $2.25, and Galvanized at $2.65.

Pittsburgh.—Demand for Plain Wire has fallen off very much, as it always does at this season of the year. The mills have a good many old contracts, and are running on these. We quote Plain Wire at $2 and Galvanized at $2.40 in carload lots, f.o.b. Pittsburgh. Slight advances are charged for small lots.

Nuts.—A meeting of the manufacturers of Nuts was held at Atlantic City on Tuesday and an advance of 2-10 cent per pound was made in the price of both Cold Punched and Hot Pressed Square Nuts, and an advance of 3-10 cent per pound in both Cold Punched and Hot Pressed Hexagon Nuts. The manufacturers united in giving gratifying reports in regard to the volume of business and the prospect of the continuance of satisfactory conditions.

Perkins' Toe Calks.—Under date June 16 Rhode Island Perkins Horse Shoe Company, Providence, R. I., withdraw previous quotations and announce the present price of Perkins' Toe Calks as 3.65 cents per pound for Blunt, and 4.15 cents per pound for Sharp, f.o.b. mill, Valley Falls, R. I., subject to a discount of 2 per cent. for cash in 10 days.

Tarred Roofing Paper.—Prices have changed somewhat in several sections of the country, including New England and a number of counties in Pennsylvania and Maryland, aggregating about 3 cents per roll advance on Two and Three Ply Tarred Roofing Paper, making the prices 58 and 80 cents per roll, instead of 55 and 77 cents as previously.

Cordage.—The adulteration of Sisal Rope results in an uneven market and a variety of quotations, which range from 9 to 10 cents, according to quality, on the basis of 7-16-inch and larger. A very general quotation for Manila Rope, on the same basis, is 13¼ cents per pound, some manufacturers allowing ¼-cent rebate for large lots. A moderate demand characterizes the market.

Binder Twine.—Under the stimulus of improved crop conditions, the commencement of harvest in some sections and its nearer approach in others, the demand for Binder Twine has improved. Some manufacturers have contracted for their output for shipment up to July 1, and are out of the market. Makers, generally, have been conservative in the quantity of Twine they have manufactured. Prices have advanced and quotations are not

uniform, with all manufacturers ranging, for small lots, with ¼-cent rebate for carload lots, as follows:

	Per pound.
Sisal	11¾ to 12c.
Standard	11¾ to 12c.
Manila	13¾ to 14¼c.
Pure Manila	15¼ to 15¾c.

Glass.—It has been known for some months that a machine for making Window Glass was being tested at one of the American Window Glass Company's plants at Alexandria, Ind. The issuing of patents at Washington covering the invention has brought the matter again before the public. Great secrecy has been maintained during the experimental period, but it is now thought by those who should be in a position to know that the machine is a success. The machine is designed, it is reported, to do away with three classes of workers, the blowers, gatherers and snappers, thus materially reducing the cost of Glass. A dispatch from Pittsburgh to the New York daily papers states that 12 of these machines have now been installed. There is considerable speculation as to the effect this machine may have upon the price of Glass in the fall, some believing that it will force all other manufacturers than those using it out of the market. It must be borne in mind, however, that 12 machines could supply but a small proportion of the Glass required to satisfy the demands of the trade, and that even if the machines in their present form prove an unqualified success, it would take considerable time to build and install enough of them to make a marked impression on the market. But this innovation may possibly be recognized as the beginning of a revolution in the manufacture of Window Glass. Demand continues quiet and the associated jobbers' quotations are unchanged. Glass purchased at low prices and lack of demand preclude the advisability of an advance by the jobbers on the present unsatisfactory market. The Jobbers' Association quotations are as follows:

	Discount.
From store, single and double strength	89 %
F.o.b. factory, carload lots:	
Single and double strength	90 and 5 %

Paints and Colors.—*Leads.*—The demand continues fair for White Lead in Oil, although there is a perceptible falling off in the size and number of orders. Quotations are as follows: In lots of 500 pounds or over, 6 cents; in lots of less than 500 pounds, 6½ cents per pound.

Oils.—*Linseed Oil.*—Current demand for Linseed Oil is confined to small lots, large buyers not placing orders. There is some talk among the trade of the possibility of an advance before the beginning of another month, the figures named being 70 cents per gallon for City Raw. Quotations are as follows: City Raw, according to quantity, 66 to 67 cents; out of town Raw, 65 to 66 cents per gallon, according to quantity.

Spirits Turpentine.—The local Turpentine market, owing to the strength developed at Southern points, continues strong and quotations are unchanged. Business at this point is on a limited scale, owing to high prices. Quotations, according to quantity, are as follows: Southerns, 49½ to 50 cents; machine made barrels, 50 to 50½ cents per gallon.

REQUESTS FOR CATALOGUES, &c.

The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.

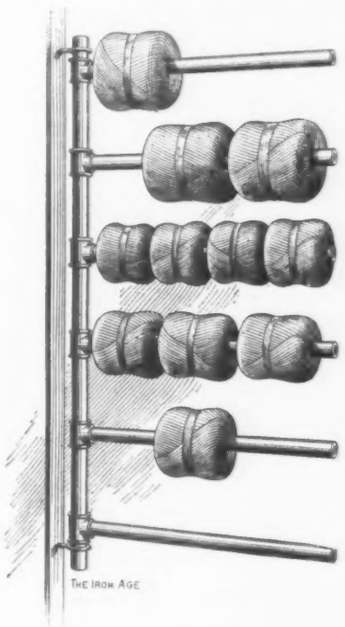
R. M. Bower, in the Hardware business at Whigham, Ga., requests catalogues and price-lists concerning Hardware and related lines.

Walter Minty is contemplating opening a General Hardware and lumber establishment at Marshall, Minn., and will be pleased to receive catalogues and other printed matter relating to the former line.

F. Kieferle has been succeeded in the Hardware business in Marion, Kan., by Kieferle Bros., who will be pleased to receive catalogues pertaining to Hardware, Stoves and Tinware, Agricultural Implements and Sporting Goods.

A RACK FOR BALLS OF TWINE.

THE rack for holding a retail stock of Twine shown in the accompanying cut was made by joining short pieces of ¼-inch wrought iron pipe by tees, forming a straight rod about 30 inches long. Into the open ends of the tees other pieces of ¼-inch pipe were screwed, parallel to each other, one directly above the other. The parallel pieces of pipe were of sufficient

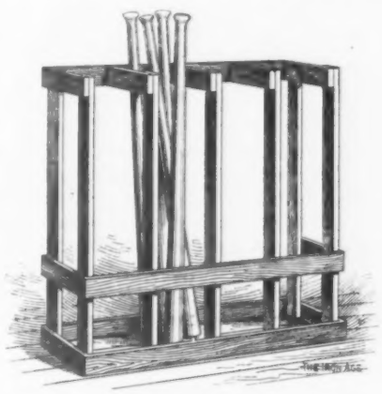


Rack for Holding Twine.

length each to hold from 10 to 20 balls of Twine, according to their size. The rack was hung by screw eyes, one at each end, against the end of the shelving. It could obviously be hung on a post or against a wall, wherever most convenient. This arrangement of the rack permits it to swing horizontally, putting the stock into a small space and at the same time displaying it in good order. The device is in use in the establishment of Eikel & Strempel, Aguascalientes, Mexico.

A BASEBALL BAT RACK.

BASEBALL BATS are not a convenient line of goods to carry unless a rack be constructed to hold them. The accompanying illustration shows a rack used by Wilson & Burr, Middletown, Conn. Though made of unfinished strips, it answers its purpose admirably. During the baseball season it is placed on the sidewalk, where it attracts the attention of the boys.



A Baseball Bat Rack.

SOUTHERN HARDWARE JOBBERS' ASSOCIATION

TWELFTH ANNUAL CONVENTION.

THE Southern Hardware Jobbers' Association are now holding a four days' session, their twelfth annual convention, at Atlantic City.

The preparations made for the meeting, the arrangement of an attractive programme and the cordial invitations sent out to the trade, with the accessibility and the attractions of the place of meeting, have brought together an unusually large attendance of members and manufacturers and a goodly number of ladies. Many delegates reached Atlantic City on Monday, including the officers and Executive Committee, on whom rested the responsibility of completing plans for the meeting. The trains on Tuesday and Wednesday have brought many more, making the gathering one of the largest in the history of the association.

OPENING SESSION

The opening session was held in the main dining room of the Marlborough House, whose ample accommodations were admirably adapted to serve the pleasure and comfort of the association. The meeting was called to order by F. A. Heitmann of Houston, Texas, who, after prayer by Rev. John W. Williams of Atlantic City and the singing of "America," gave a brief address of welcome, and introduced Hon. Franklin P. Stoy, Mayor of Atlantic City, who extended the freedom of the city to the members and their friends. He was followed by C. E. Speer of the Speer Hardware Company, Fort Smith, Ark., who welcomed the manufacturers. A response was made by F. L. Clark of the Alabama Tube & Iron Company of Birmingham.

The president's annual address was listened to, as were the other addresses, with close attention and much appreciated by the members.

Brief and informal remarks were also made by N. A. Gladding of E. C. Atkins & Co., Indianapolis, Ind.; Robert Garland of the Standard Chain Company, Pittsburgh, and others.

The report of the Reception Committee was made by Irby Bennett, who indicated in a general way some of the arrangements made for the pleasure of the guests.

TUESDAY AFTERNOON SESSION.

The afternoon session was of an executive character, and notwithstanding the attractions of Atlantic City and the splendid weather with which the convention was favored, there was a good attendance of the members. Most of the time was occupied with routine business, such as the reports of officers and committees.

The general work of the association and what had been accomplished during the year was indicated in the report of C. B. Carter, its popular secretary and treasurer. Five new members were added during the year, giving it a membership of 76, the largest in its history.

The reading of the prize essay on "Trade Mismanagement and Its Consequences" was one of the interesting features of the meeting.

Addresses were also made by W. W. Supplee, ex-president, and T. James Fernley, secretary-treasurer of the National Hardware Association, who touched especially upon the broader relations of the jobbing trade. It was intended also to consider practical questions through the question box, but the pressure of other matters precluded and the session came to a close.

WEDNESDAY MORNING SESSION.

A large number of jobbers and manufacturers assembled Wednesday morning to consider the many interesting and practical subjects covered by the programme. Besides the papers presented informal addresses were made by George V. Willson, Webster R. Walkley, William W. Supplee, J. D. Moore, ex-Governor Goodell, Charles H. Ireland, James H. Mann and R. R. Williams. The session was a very interesting one, and many matters of importance were touched upon.

PRESIDENT F. A. HEITMANN'S ANNUAL ADDRESS.

The twelfth annual convention now assembled at Atlantic City is the most substantial recognition of the efforts of the members who 12 years ago so wisely united in a friendly spirit to cultivate a closer relation and to better the condition of the Southern Hardware jobbers and to place them on a successful and permanent basis.

DEVELOPMENT AND FUTURE OF THE SOUTH.

About me I see gentlemen who have stood at the helm of their business under most trying circumstances, and who will always remain steadfast and faithful to their obligations. I also see about me young men who are pushing forward the Hardware business established by their forefathers and at the same time are everlasting in their efforts to build up the South. With

F. A. HEITMANN, President.

Southern pride for a "watchword," they are pushing forward for substantial recognition.

This being the case, it cannot be a surprise when you see the South's industrial development, which has so rapidly gone through the South, carrying with it development of this magnificent institution both commercially and educationally.

Foreign and Northern capital have investigated carefully, and find that it is very much to their interests to place their capital in the South for permanent and profitable investment.

Never before has the future of the South looked as encouraging as it does to-day. It is for this reason that I can see no cause for anxiety on the part of the Hardware, machinery and supply dealers in reference to the future of these lines of business; where there is a developing market there is bound to be increased business.

JOBBERS' PERMANENCY ASSURED.

The Hardware jobbers in their various communities are so closely interwoven with the interests of their various sections where they are located that their permanency is assured and their destruction would therefore be impossible.

The apprehensions and fears in the hearts of some were brought on through the merging of large manufacturing industries in the various lines of products handled by us. In the beginning of these so-called trusts we were all very apprehensive as to the policy they would pursue in reference to the marketing and the prices of their lines of products.

It was thought by some that an extraordinary position would be taken, whereby the usefulness of the Hardware jobber would no further be necessary. But these

gentlemen who have formed these trusts are gentlemen of brains, with enormous capital back of them, who are working the manufacturers' interests strictly on the lines of manufacture and are closely adhering to that branch of the business, having been content that the jobber with his immense capital invested and experience and organizations for the purpose of distributing these lines of goods, was in better shape to handle that end of the business than the manufacturer could, if he were to try to go direct to the retailer or consumer on the miscellaneous and complicated lines of goods, which vary both in quantities and sizes.

The trusts and combines are now long enough in business to have fully satisfied us on this proposition, therefore it behooves the jobber to more closely than ever watch the interests of his business. He requires larger capital invested, carrying larger and more complete stocks of goods, for the purpose of prompt shipment from stock.

MANY OF THE EVILS

that the jobbers are now suffering from are the direct result of the days when the jobbers were in the saddle and the manufacturers were walking by their side; the former controlling the situation in every respect, dictating terms, deliveries, prices, cash discount, last, but not least, requiring the manufacturers to have a "jobbing department," as you might call it, in order to distribute their wares in small quantities direct to their customers, either retailers or consumers, in order to be able to reduce their price in a territory far remote from them, and where they would be compelled to solicit business under abnormal conditions, in competition with a legitimate jobber located in those remote territories.

If the jobbers centrally located or favorably situated with the manufacturers would carry the same stocks in proportion to their business that the jobbers on the Pacific Coast or on the Gulf Coast or any other remote territory are compelled to carry, they would not be found so far from their legitimate territory.

It was one of the wisest moves manufacturers ever made when they stopped the distribution of all these goods direct for the account of jobbers favorably situated. It is these jobbers who are doing a jobbing business on a brokerage basis who are now complaining of the conditions that exist. Fortunately the prosperous times now existing in America have brought on the most wonderful demand for goods, to such an extent that prompt shipment cannot be expected from factories; therefore these small, direct shipments are cut out and are being abandoned as unpractical and unwise and very unsatisfactory to the retailer and consumer.

In the merging or organization of the great interests worked out on new plans and ideas it would necessarily follow that they would find some of their methods unpractical and therefore also find it would be to their interest to amend or make changes. It is in the power of this association to closely guard their interests through their officers and committees and closely cooperate with the officers of these various trusts, and many of the evils which are complained of can be corrected. I feel that they are just as anxious for our business as we are to do business with them; in other words, our interests are mutual and will remain so as long as the jobber will remain a jobber.

It was the pleasure of this association to establish a precedent of inviting manufacturers and manufacturers' representatives at these annual meetings. It is now the universal custom of every Hardware organization, as they have found it not only pleasant, but substantial co-operation.

THE MANUFACTURERS' ASSOCIATION.

The manufacturers, always on the alert for good things, have seen fit to organize the manufacturers' organization, composed strictly of manufacturers of lines of Hardware. They have also wisely selected the same dates for their meeting each year and the same place as the Southern Hardware Jobbers' Association, thereby having an opportunity of attending the meetings and discussing matters to their interest twice a year.

This is the first meeting of the manufacturers' association since their organization last fall at Cleveland, Ohio. You will see that this association will also carry with it a prestige of drawing a greater attendance from manufacturers and manufacturers' representatives at each of these meetings, which will make it far more advantageous to us as well as them. You will see therefore that the opportunity now presents itself to present whatever complaints or suggestions we might have to make directly in their convention and have them report back during our meeting where it is possible to do so. In many instances it may be necessary for them to take them up with their home office, but we certainly can make our wants better known through the cooperation of these organizations at the meetings than we could in the former way of passing resolutions and taking it up through our various committees. The usefulness of these organizations therefore is very apparent and we will be able to accomplish better and more direct results than ever heretofore.

There can be no doubt that the resignation of our

C. B. CARTER, Secretary-Treasurer.

worthy president, J. D. Moore, came with great surprise and regret to the members of this association. His untiring efforts and energies, coupled with his long years of experience in this line of work and his knowledge of the Hardware business, made him a most valuable president. The association will join me in extending our most hearty thanks for his faithful services and in wishing to have his hearty co-operation in the future, which he has so kindly extended in the past.

Only having occupied the president's chair for a few days, it is impossible for me to go into the details in reference to matters which have occurred during the last year, and I will therefore be compelled to rely on our worthy secretary to refer to all such matters in his report, which can be taken up for consideration.

Gentlemen, in conclusion, I wish to thank you for the indulgence extended.

ADDRESS OF WELCOME TO THE MANUFACTURERS.

BY C. E. SPEER OF SPEER HARDWARE COMPANY, FORT SMITH, ARK.

"American locomotives, running on American rails, now whistle past the Pyramids and cross the long Siberian steppes. They carry the Hindoo pilgrims from all parts of their empire to the sacred waters of the Ganges. American bridges span rivers on every continent. American cranes are swinging over many foreign moids. Wherever there are extensive harvests there may be found American machinery gathering the grain. In every market of the world tools can have no better recommendation than the mark 'Made in America.'"

Thus we read from the pen of ex-Assistant Secretary of the Treasury F. A. Vanderlip.

The American manufacturer is to-day the cynosure of the commercial world.

We are honored by the presence of a large number of these gentlemen who have made America famous, and the pleasant duty of extending welcome to them has been assigned to me.

Our membership, extending from the District of Columbia to the southern limits of Texas, represents widely diversified interests, and were it not for a subtle influence exerted over us by the manufacturer who sends to us the best talent of this commercial age—past masters in psychic art whose influence for good is insinuated into us in such a charming manner that we flatter ourselves into believing we are possessed of all the virtues—we would find more difficulty in harmonizing our differences. To this influence, perhaps more than any other, may we attribute the beneficial results and success of our association.

It has been announced by various trade journals that the manufacturers have appointed this same time and place to hold their semiannual meeting that they might enjoy the social features of our meeting. Evidently the writers of these notices have attended our gatherings

C. E. SPEER, Speer Hardware Company.

before, but have never been able to get beyond the social feature. I realize how hard it is to get over it. If this is all that brings you we are glad you are here, even for that, and we will endeavor to make you feel repaid for your coming. In fact, if there were no social features, there would be no convention. At the same time we have matters of grave import to consider, and we will doubtless lodge some complaints against you. I therefore warn you to touch the social features lightly, and before you feel "that old convivial glow" too strongly "o'er you stealing," prepare your defense.

THE JOBBERS' DISQUIETUDE.

The thoughtful and observing manufacturer has noticed the feeling of unrest that has characterized the movements of the jobber the past year or two—an inclination to do something, yet without any well prepared plan of action. You have seen a quite recent attempt to radically change conditions. For all of this disquietude there must be some underlying cause. Either the returns on investments are inadequate or danger is scented from afar.

The tendency of the times is toward consolidation. Monopoly pervades America. This is strikingly true of manufacturing industries, and while you claim the primary object of consolidation to be economy, the arbitrary advances you frequently indulge in leave one with the impression that economy is not the only object to be attained. Is it not probable that your jobbing friends, studying this question of merging interests, fearing that out of it all might grow an aggressive selfishness, a desire to eliminate him from the whole proposition, in a spirit of self defense attempted to adopt David Harum's golden rule?

CATALOGUE HOUSES.

Realizing as you must the inroads catalogue houses are making into the profits of legitimate business, we are at a loss to understand why you do not take steps to check them. It is not so objectionable that you sell to them as that you permit their putting your product on the market at unremunerative prices. The power to control this lies in your hands, and we sincerely hope you will more vigorously use it.

SELLING TO CONSUMERS.

Our secretary frequently astonishes us by calling our attention to some manufacturer who has his representatives in the field canvassing the consumers. There must be something wrong with us or you would not be forced to do this. Are we too timid to invest our money in the new things you make, thus forcing you to either seek the trade direct or sacrifice them to the catalogue houses?

We have invited you here to talk over all these things with us in a kindly spirit. You create for us to distribute, and neither of us can afford to act arbitrarily toward the other. Our ambition may often lead us to the point where the love that worketh no ill to our neighbor is forgotten. We may find ourselves controlled by a selfish desire to dictate upon what terms he may live. Political economy assumes that selfishness undisguised and absolute governs the realm of exchange. We expect you who have achieved so much glory at home and abroad to refute this assumption. We expect you to lighten by your good will and broad intelligence the pressure of economic laws. We want you to teach us

"To live to make men love us,
To live to make men true—
For the wrongs that need resistance,
For the good that we can do."

Let us show to the world that at least one branch of commercialism is free from cannibalism; show that it is not impossible to mix Christian charity and kindness with business. Let us disprove the proverb that "corporations have no souls," and show that out of the transmigration of the individual souls grows a larger and more charitable one. If in the conduct of our business we study our relations to our associates and our duty to that great army of men who are instrumental to our success we will show that to declare semiannual dividends is not our sole aim.

MUTUAL CRITICISM.

We have invited you here expecting to criticise many of your policies, and in turn ask you to point out our defects. If we have fallen into the practice of placing our orders in January for special brand goods and cancel them in June, after you have expended your time and money getting them ready, or if we make unjust claims for shortages, discount net cash bills, or in numerous other annoying ways defraud you of your just profits, now is the time to make us promise to do better.

On behalf of every member of our association I now welcome you, your wives and sweethearts to share with us the hospitality of this city so magnanimously given us by its Mayor. We have provided a large number of guardian angels to minister to your comfort and welfare. While this is a "side line" for them you will find they are proficient. They represent you on the road, but they represent us here. Always obliging, always pleasant, eagerly awaiting an opportunity to do you a service, we unhesitatingly put ourselves and you into their keeping.

TRADE MISMANAGEMENT AND ITS ATTENDANT CONSEQUENCES AS VIEWED FROM A TRAVELING MAN'S STANDPOINT.

BY W. A. RAY OF TEAGUE & SONS, MONTGOMERY, ALA.

No doubt there will be many different ideas put forth in the treatment of this subject, for the methods that seem best to one manager another will deem altogether wrong, and the treatment that will please one customer will displease another. But I feel sure that

no orders will be lost by all jobbers and their men avoiding the mistakes I will mention. As the traveling man comes in direct contact with the buyers, he is largely responsible for losing the orders the other man gets, and very largely for the profits he fails to make.

He is asked to meet a quotation which a buyer claims he has, and the poor fellow hasn't the nerve to even find out if the quotation is genuine, or the tact to refuse to meet it, and at the same time get the order. Buyers are sometimes mistaken as to the prices they have, and the salesman who meets all the quotations he hears of will ruin his profits, and his customers will "work" him and give their best orders to a better salesman.

PRICES LOWER THAN OTHERS.

Some have an idea (usually correct) that they cannot sell goods unless their prices are lower than all others. These are "petted" by the buyers, "cussed" by other salesmen and soon discharged by their houses, but it takes a long time to get over their work in a territory. The starting point of this mistake is when a cost price is given to an incompetent man.

Some salesmen, usually those who are employed on a profit sharing basis, stoop so low as to literally buy their orders, paying cash rebates, even on contract goods, charging money thus paid out in expense account. Buyers are quick to find out these acts of dishonesty, and reason wisely that their time will come to be cheated. Therefore they give their most profitable orders to salesmen whom they can trust.

FAVORABLE IMPRESSION.

Salesmen very often do not use proper care as to time, place and manner of approaching a buyer. A great deal depends on a favorable impression, and a very little thing will turn the tide of an order. A safe thing to avoid in the presence of a buyer or his customers is gossip or heated discussion, especially about politics, religion or competitors. Talk of the two former is very likely to offend and of the latter only furnishes free advertising.

Goods are sometimes misrepresented or too highly praised. A disappointed customer is likely to send his next order elsewhere.

AN OVERBEARING,

"know it all" manner may please a few buyers, but the majority will resent such treatment and buy from the other man. On the other hand, orders are lost by being too timid. Unless a salesman is fully confident he is not likely to make a favorable impression.

Wrong kinds or brands of goods are sold to a customer because the salesman is not properly posted as to the customer's needs. Many buyers are more ignorant than they wish to appear, and they appreciate and patronize those who can supply their deficiencies without calling attention to them.

How much jobbers lose by sending out small salaried, incompetent salesmen can never be known, for no record can be kept of the orders that are missed by such men. They also cause the loss of the respect and patronage of their houses, and even the best of men must take a long time to regain it.

MAIL ORDERS.

Much dissatisfaction is caused by the careless handling of mail orders. Usually a customer is out of the goods he orders by mail, and even a trifling omission or delay seems gross carelessness to him. Items are placed on back orders or "scratched" without notice to the customer, who daily expects the goods and gets very angry when they don't come.

SUBSTITUTED ARTICLES

are sometimes satisfactory, but in the great majority of instances they cause a lot of trouble and are best left off altogether. Orders are often held necessarily for a few days, but the customer is not notified of the cause of the delay and when he may expect a shipment. As he knows no reason for delay he supplies one, usually wrong and always detrimental to the jobber from whom he ordered the goods.

The mistake is made by some houses of not keeping in close touch with the trade by correspondence, circulars, &c. The traveling man is depended on to do all the soliciting. The result is the well advertised, letter writing houses get the mail orders.

Parties are sold who have no right to credit, nor any idea of business methods of legitimate profits. This practice leads to a wreck of prices, a clamor for cheaper goods and is the making of many bad accounts.

LONG DATINGS

are given instead of the usual 60 days. This often causes a customer's account to get larger than it should be, but as there is nothing due, he cannot be asked for a payment nor a check put on his buying without giving offense. Prompt payment of accounts is not insisted on, and they are allowed to become overdue without arrangements being made for an extension. The account usually grows larger and gets proportionately harder to pay. The final result is loss of both the customer and the account.

A weak customer gets behind, and instead of writing in a straightforward, business-like manner and telling him that it is not satisfactory to ship more goods until a payment is made, his orders are entirely ignored or held for a few days, hoping for a remittance, or the principal items are scratched, or some other excuse is made, until the customer has a just reason for getting mad, and he does so. Then the account is hard to collect sure enough.

Only one more mistake I will mention: Trying to improve business methods and avoiding those mistakes without the co-operation of other houses and their salesmen. This will never be done.

MANUFACTURERS' ASSOCIATIONS AND THEIR RELATIONS TO THE HARDWARE JOBBING TRADE.

BY FAYETTE R. PLUMB, PRESIDENT OF THE AMERICAN HARDWARE MANUFACTURERS' ASSOCIATION.

When I received the kind invitation from your secretary to address you to-day I was somewhat reluctant about accepting it on account of my last appearance before you at Old Point Comfort in June, 1900. At that time I had rather an unpopular subject to discuss, as I was enlisted on the side which opposed cash discounts. While I was assured that my remarks were appreciated they evidently made a very poor impression, as I was waited upon, 15 minutes after adjournment, by your Executive Committee, who requested me to use my influence toward the restoration of the 2 per cent. Now that this matter is settled and the manufacturers have met your wishes I do not mind saying that I opposed the change in terms to 30 days net at the time of adoption; but it seemed a wise expedient then, and I gracefully accepted the inevitable; and as I was invited to defend my position I did the best I could for my colleagues.

The subject assigned me to-day is one I have always favored. During an experience of over 38 years as a manufacturer of tools I have invariably found that when I was working in harmony with my competitors the business was not only conducted much more satisfactorily, but better prices prevailed, the market was steadier, the jobbers realized better margins and were, therefore, better satisfied with the existing conditions.

DIFFERENTIAL BETWEEN JOBBER AND RETAILER.

Confidence in the sincerity of the manufacturer to recognize the jobber as a friend and one that must be encouraged to be induced to act as a distributing agent must be brought about by the strict observance of the following points:

First.—Protection.

Second.—Moderate advance in prices.

Third.—Strict maintenance of discounts adopted.

Those who adopt the policy of making a liberal differential between the jobber and retailer, and who refrain from soliciting business from the latter, are not only more successful themselves, but their customers are placed in a position where they can realize a better margin, and are less liable to oppose an association; in

other words, their interests become identical while the volume of business increases, as it is always to the advantage of the jobber to push the sale of all goods that afford the best margin.

The low prices prevailing prior to the formation of an association often forces the manufacturers to get together for protection. If their action at such a time is conservative and their advances are made at proper periods they strengthen and greatly benefit the entire trade. To bring this about the advances must be made once or twice during each season, and extend over a period of two or three years.

CONFIDENCE.

No association can last any great length of time unless the manufacturers have confidence in each other. This feeling can only be strengthened by strictly maintaining prices and terms. No jobber cares what price he pays for goods, providing it is within reason, if he is confident he is buying as low as his competitors, and when he finds that all of the manufacturers are firm in the position taken he soon accepts the situation and is much better satisfied than he would be with an open market.

To summarize briefly, human nature is the same the world over. Therefore, if the manufacturer wants his association to succeed and is anxious to make the jobber his friend he must make him his partner in any advances and protect him in quotations made to the general trade.

I have endeavored, in a general way, to give you my views in regard to associations as they are usually understood.

AMERICAN HARDWARE MANUFACTURERS' ASSOCIATION.

We now come to the consideration of an association formed on much broader lines. I refer to the American Hardware Manufacturers' Association, born at Cleveland in October last. This action was taken during one of the most successful meetings of the National Hardware Association. The friendly spirit engendered during such sessions as you are now holding in this city has brought about the formation of our association. We were not only impressed by the good feeling prevailing among your members, but also by the good fellowship existing among the manufacturers, especially those who had been directly opposed to each other in the past. Therefore, those manufacturers who had been accustomed to attending your conventions were not only anxious to have something to occupy their time while your members were in session, but were also desirous of correcting abuses which have crept into the trade by excessive competition.

I will not burden you with a list of the abuses referred to, but you can rest assured that any action taken by our association will be along such lines as will meet the entire approval of any fair minded business man. At the same time, we shall be very glad to consider any suggestions for the betterment of the general trade that the merchants may offer and earnestly solicit your co-operation.

We are proud to be able to say that there is no organization in this country which includes in its membership brighter minds or larger capitalists than those representatives who adorn our roll, and we therefore hope that great results will follow as time progresses and we become accustomed to the work allotted us.

In fact, our association can become almost anything the members may choose to make it if the proper interest is taken. The success that has thus far attended our efforts has certainly been most gratifying, owing to the interest shown by our Executive Committee; in fact, I may say that we are fairly launched upon the seas of trade and commerce and we have every reason to hope that our ship will be able to hold its own with others who are embarked upon the same voyage, provided our crew remain loyal and our officers familiarize themselves with the duties of their position. I am, therefore, justified in predicting a bright future for the American Hardware Manufacturers' Association.

RECIPROCITY.

BY JOHN C. SCHMIDT, PRESIDENT STANDARD CHAIN COMPANY, YORK, PA.

When I first received the invitation of your secretary to say a few words to your convention on the subject of "Reciprocity" I felt not only honored but pleased, for reading between the lines, I inferred that my many friends in your association seemed, by the selection of such a topic as my subject, to show their appreciation of the policy of our company in confining our business exclusively to the jobbers. Then, thought I, a few eloquent words from me on this subject would be all that was necessary to bind us together with links of steel, and that you would show your appreciation, both of the subject and object, by sending your combined stock order to our company, to be filled at our own time and our own prices, and thus evidence your ideas of reciprocity; but when I received the copy of your attractive programme and saw my name in cold type I began to realize that I was up against the "real thing." I immediately set to work to write a paper, which, if possible, might be worthy of the subject, the occasion and the intelligence of my auditors. I struggled with the subject night and day, hoping that I could

JOHN C. SCHMIDT, President Standard Chain Company.

startle you with the array of the knowledge which an old York County Dutchman could present; but the well turned sentences of sounding oratory would not come at my bidding, and, after numerous attempts, which resulted fatally to two stenographers, and on my secretary's request for a permanent leave of absence, I gave it up, and simply present a few thoughts admittedly unworthy of the subject.

Reciprocity is an interesting study. It is not a new principle, although, as applied to our national affairs, it has comparatively recently become very prominent. The more one studies the question the deeper and more intricate does it seem, and the more difficult the problem that confronts the National Government to determine what action should be taken that would benefit the country at large without injury to any industry. One hundred years ago Napoleon contemptuously referred to England as a "nation of tradesmen," but times have changed in the last century, and France now glories in the fact that she is a great manufacturing country and proud of her large trade, and is even now knocking at our doors requesting the enactment of a reciprocity treaty, which, however, is not likely to pass the Senate.

DEVELOPMENT OF EXPORT TRADE.

Webster defines reciprocity as "mutual action and reaction," and in the history of our Government as early as 1793 Thomas Jefferson made a report to Congress, in Washington's administration, recommending reciproc-

ity as better than retaliation. The National Government, of course, requires revenue for its operation, and the tariff is so regulated as not only to produce the necessary revenue to carry the Government, but to protect and encourage manufacturers. The United States has come to take a foremost rank among the manufacturing nations, and is each year extending its export trade. All goods exported bring to this country increased wealth, and the hope of our future greatness is based largely upon the anticipated increase in our export trade. To operate one portion of a factory exclusively upon export trade simply means a reduced cost for the entire product; and export trade should be looked upon by the nation at large with the same interest as the establishment of a new factory is locally regarded.

The advocates of reciprocity are divided into two classes—the masked free trader, who seizes upon reciprocity as a club wherewith to beat down the present tariff, and the protectionist, who is willing to make concessions in our present tariff rates to such other nations as will do the same, thereby allowing each to export such articles which it is best able to furnish to the other. In 1890 Mr. Blaine, who was one of the foremost champions of reciprocity, stated that he objected to "giving something for nothing," and this is to my mind the keynote of reciprocity. This, any of us traders will clearly understand, is good business. The experiments, however, which were then made with reciprocity hardly had an opportunity to be fairly tested before the Wilson bill went into effect in 1894 and destroyed reciprocity by a voluntary reduction of the duties. The ordinary business principles which govern the administration of any large organization could and should be applied to commercial treaties. We now have a tariff which was purposely made higher on certain items under the Dingley bill than under the Wilson bill for the very reason that part of this advance could be taken off without injury to any industry; and in consideration of this reduction in our tariff substantial concessions could be won from other countries.

I am a protectionist, have always believed in this principle, but we must have reason in all things, and be reasonable with other nations. In trying to secure something from them we must, of course, expect to give something in return. Every one knows that it is a surplus of products which causes the lowering of prices, and their scarcity the advance. If we can build up a large export trade, we will not only find a market for our surplus, but add to the stability of our prices by utilizing a demand which is not affected by local conditions in this country. Nor is the export trade affected as much by the seasons as is our home business. This is caused by the fact that their seasons are different from ours, and their purchases, on account of the long time in transit, must be made much earlier than those made by jobbers at home.

RECIPROCITY WITH CANADA.

Our first experience with reciprocity was the most natural one, with our near neighbor, Canada. This treaty went into effect on March 16, 1855, and lasted 11 years. It has been frequently pointed out that this was unsatisfactory, as during the life of this treaty our imports grew more rapidly than our exports. This, however, is hardly a fair comparison, as during the latter half of the life of the treaty we were torn up by the great Civil War, and consequently did not have the commodities to exchange.

This Canadian treaty differed very much from treaties as now drafted, because it provided for the free admission of a list of articles mainly limited to the products of the mine, the farm, the forest and the sea. There, however, were no stipulations limiting duties on manufactures, the importance of which was not then realized. The exchange of products for 20 years, from 1850 to 1870, amounted to nearly $1,000,000,000, and the excess of our exports was $22,000,000, a nearly equal exchange. In the six years from 1864 to 1870 our Canadian imports exceeded our exports by $60,000,000, and this unquestionably changed our policy. To my mind this Canadian treaty should never have been abrogated, but amended. Canada is a growing nation of intelligent, active business men who are learning the lesson of protection by studying our experience and applying to her own commerce the principles we have tested and proved. The party in power in Canada to-day is a protective tariff party, and by this protection they are rapidly building up their manufactures; in many instances taking factories from the United States bodily, and not only our factories, but our people. Only last week I noticed in the public press, in glaring head lines, "Americans Invade Canadian West," and that 200,000 Americans will this year cross the Canadian border. This movement is urged by strong economic reasons—that is, the farmers of Iowa, Kansas, Indiana, Dakota, Minnesota and Nebraska can sell their land at from $25 to $60 per acre and buy land that will produce better and more abundant crops in the Canadian Northwest for $15 per acre.

This means that Canadian commerce will expand and with it a demand for manufactured product, and the American manufacturer must either have concessions in the Canadian tariff or move to Canada with his factories. Canada has for a number of years past endeavored to enter into a reciprocity treaty with us, but in the meanwhile, by her protective policy, is building up her own industries. The original treaty of 1855 was based on improper lines. It was limited free trade. What is now demanded is mutual concessions from the existing tariff.

Canada's regard for the mother country is so strong that she allows imports from England a special rebate of one-third of the Canadian tariff, and to still further build up the trade between Great Britain and its colonies the Hon. Joseph Chamberlain has called a convention of all colonial Premiers, to be held in London immedately after the coronation this summer. If this prove successful the differential allowed England will be even greater than at present, and the American manufacturer will be still further handicapped in selling his products in the British colonies.

RECIPROCITY OF INCALCULABLE BENEFIT.

We are no longer in our swaddling clothes, but as President Eliot of Harvard University said in his greeting to Prince Henry during his recent visit, "We are a venerable nation compared with such a young Government as Germany," and the actions of our Government with its protective tariff have been watched by other nations, and they have adopted the same policy to a very considerable extent. It is true that this, in part, has been caused by a spirit of retaliation, but even so, now that they have retaliated, would it not be wise for us to come together and by cutting the inequalities in our tariff make concessions to other nations, not because they demand it, but because they will give us something of value in exchange therefor? In other words, any revision of the tariff should be made by its friends. There is no doubt in my mind that reciprocity would be of incalculable aid to American manufacturers if the principles were intelligently and properly applied. This, however, can only be done by men of wide experience as diplomats and thoroughly versed in all branches of trade.

DEPARTMENT OF COMMERCE.

During the proceedings of the United Reciprocity Convention, held last fall in Washington, George C. Seabury of New York made what I consider a very valuable suggestion—that is, that a Secretary of Commerce and a Tariff Commission be appointed, composed of able men who have made a practical study of trade and commercial economics, to whom all questions affecting international trade and commerce should first be submitted. This Department of Commerce to be under the jurisdiction of a member of the Cabinet, to be known as the Secretary of Commerce. Such a position would be a most important office, and one which would be of great service to the country.

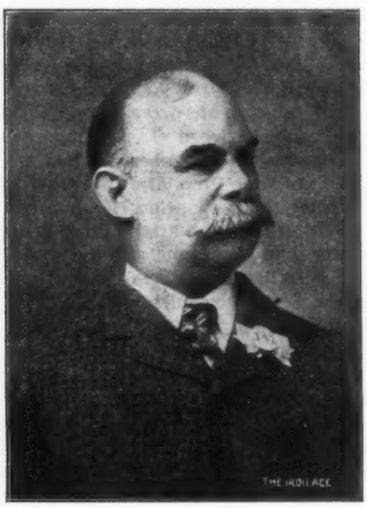
About 30 years ago we first established a Commissioner of Agriculture, Judge Watts of Pennsylvania being the first to hold this office, and under his careful administration so much valuable information was collected that it finally became a Cabinet position, and a very important one. The same course of proceedings should be adopted in regard to the Department of Trade and Commerce, and I hope we will soon see the day

when the needs of this department will be recognized and a Cabinet officer placed in commission having this important department in charge.

"N. I. T."

BY S. G. GILFILLAN OF BELFONT IRON WORKS COMPANY, IRONTON, OHIO.

When I recall to mind the subject of my address, "N. I. T.," and realize fully the meaning of it, "Nothing In This," I am very forcibly reminded of the absent minded man who, while reading from one of our numerous excellent Hardware magazines a very, very interesting article on engineering, and concluding that he would like to make an engineer out of his son, turned suddenly to his wife and begged her to agree with him in this case. "Will you promise to let me have my own way this time? His wife replied, "What do you want?" He replied, "First promise to agree with me; I have set my heart upon it. Do you promise to leave it entirely in my hands?" She replied that she did not know what he wanted, but nevertheless would grant his request. "Now what is it?" "Why," he replied, "I want to have our son study engineering." His wife very quickly replied, "What are you talking about? We have no son." He replied, "I forgot that." Likewise I have no subject, but will, if possible, forget that fact.



S. G. GILFILLAN, Belfont Iron Works Company.

Your Executive Committee, who have seen fit to honor me in this way and who have "brought me out," as it were, this being my first effort of this kind, while favoring me did not, I believe, fully realize what trouble they were bringing upon themselves and their good friends. As I look around upon the intelligent, bright, handsome faces I not only see sympathy, but also some uneasiness on the part of my listeners, which recalls to my mind an actual occurrence. A very prominent, but rather aged lawyer, a life long Democrat, called upon President Cleveland during his first term. This aforesaid lawyer, although a very deep thinker, talks very slowly and deliberately, so when he returned home, being somewhat out of humor, he announced that he would never again support Grover. When asked for his reasons he replied that he had scarcely talked to him two hours when he discovered signs of weariness creeping over his countenance.

I am glad that going out between acts is not permitted, for fear those who go will not return, and I desire to assure you that if there is anything good at all in this rambling talk it will be the closing of it. The Executive Committee consented to my speaking all around my subject, even if I said nothing that had any bearing upon it. I am glad to be here. I love to attend the Southern Hardware Jobbers' meetings; in fact, I enjoy them almost beyond belief. It is a very great pleasure to me to meet not only the members, their wives, daughters and sweethearts, but also their guests from all parts of this great, glorious and beloved country of ours, than which there is none, no, not one, greater or more beautiful. These meetings are to me an oasis in the desert of work, work, work. They remind me in my actual experience of something that I read in the paper. A very small, thin man was following a very large, fat woman. When she discovered it she turned on him and, in language that was more forcible than elegant, demanded that he discontinue following her. He replied in the most abject way possible, "Oh, madam, please allow me to follow you; it is the only shady spot that I can find on the whole street."

We are here both for business and pleasure, and I am quite sure that we will, every one, as has always been the case, be greatly benefited by our attendance upon this convention and our association with our hospitable friends from the "Sunny South."

And now, Mr. Secretary-Treasurer Carter, I have the pleasure of keeping my promise by presenting to your association, with the compliments of the Belfont Iron Works Company of Ironton, Ohio, something that I trust will adorn the walls of your office for many years to come. Kindly accept this as a slight token of our esteem and friendship for your association.

THE EFFECT OF PRICES ON CONSUMPTION.

BY W. H. MATTHAI OF NATIONAL ENAMELING & STAMPING COMPANY, BALTIMORE.

The subject you have selected for me is not to my liking. There is an almost total lack of accurate statistics bearing directly upon it. I cannot therefore deal with facts and figures and seek to make plain the practical lesson they teach. I am driven for my material to opinions differing among themselves as widely as those expressed upon the reciprocity question. Of course, I do not mean to say that any one doubts that prices may affect consumption, and that if the changes in them are great enough they will.

The United States alone now probably uses every month more Aluminum than the whole world a quarter of a century ago consumed in a year. . The valuable properties of this metal were as well known in the seventies, when it sold for $10 a pound, as they are now, when it can be bought for one twenty-fifth of that price. The increase in consumption has been due almost entirely to the reduction in price.

When half a century ago the average charge of the Pennsylvania Railroad Company for hauling a ton of freight a mile was 5.4 cents the total tonnage was perhaps not one two-hundredth of what it now is, when it receives for each ton of freight it carries a mile about one-tenth of what was paid to it 50 years ago for the same service. Its gross freight earnings at one-tenth of the price per ton are at least 20 times as great.

When prices are high in proportion to average incomes, people get along with very little.

I have heard that a distinguished clergyman still living tells that when, nearly 60 years ago, in what was then the wilds of Northwestern Pennsylvania, he was taking his bride with him to the place at which he was stationed, he stopped for a night at one of the best houses to be found on the road. In the morning, after they were up and about to leave the room, the hostess came to their door and asked for the tin basin in which they had performed their ablutions. When they came to breakfast they saw the same tin basin on the table filled with the potatoes which were to constitute an important part of their meal.

When tin basins cost five or ten times what they do now people managed to use very few of them.

IF A GREAT REDUCTION IN PRICE

of useful articles is capable of increasing their consumption largely, so a very great increase in price will limit their use.

Early in 1861 cotton sold in Liverpool at 14 cents a pound. In 18 months its price had risen to 60 cents a pound. Of course, the effect was to reduce greatly the

consumption of cotton goods. People took more care of the cotton clothes they had, and they kept on using them when under other conditions they would have consigned them to the rag bag. Other fabrics which could not compete with cotton at normal prices were used in its place when its cost was about four and a half times as much as it had been.

A decade or more ago a great French syndicate attempted to corner the copper production of the world. It succeeded in obtaining substantial control of all the important sources of suppy. It put up the price to a figure at which it believed it was certain to make great profits. In the end its members were ruined, because it could not market the product. Nobody would buy any copper unless he absolutely had to. When every user was set to thinking very seriously as to whether he could not get along without copper many users found that in whole or part they could.

At the prices which prevailed 25 or 30 years ago it would have been impossible to employ steel for many of the purposes for which it is now used, and which now consumes a large part of the enormous annual production. It is because steel as compared with other materials is cheap that it is now used in so many ways in which formerly it was not employed at all. The United States Steel Corporation have, I think, very wisely adopted the policy of keeping prices on the finished products on a comparatively low basis, notwithstanding the recent sharp advance in the prices of raw material, and in spite of the fact that the demand has been, at least temporarily, so great that higher prices could easily have been obtained.

SOMETIMES THE REDUCTION IN CONSUMPTION

brought about by a great rise in prices cannot be made good by a corresponding reduction in the prices at which the products are offered. This result is not unlikely to happen when the high level of prices has been long maintained. Under such circumstances there has been time for experiment and inventive genius to discover substitutes. Sometimes these substitutes are good enough subsequently to be able to supplant or at least to maintain themselves in competition with the original article even when that has returned to its normal price level.

There is no difference among any of you as to these points. What practical men in business are interested in and about which they cannot always agree is whether fluctuations of price within comparatively moderate limits have any important effect upon consumption. Consumption may be greater under higher prices than it was under lower. Indeed it frequently is. Consumption of almost everything which directly or indirectly goes into the living expenses of an ordinary family is very much greater than it was five years ago. Yet the editor of *Dun's Review* calculates that the present cost of such articles is now about 40 per cent. greater than it was in 1897. Prices were low five to seven years ago because consumption—that is to say, demand—was small. The principal, though doubtless not the sole, cause of the present high average of prices is the very great consumptive demand. Except where labor is voluntarily idle in the prosecution of industrial warfare through strikes, almost everybody is employed. Wages are somewhat higher than they were in 1897, and although the average increase in the normal rate has been small, the income of a large part of the population is materially greater because employment is much more regular and steady. Many families who felt constrained to pinch themselves in every direction during the continuation of the hard times which began in 1893, have for the last three years and a half been able to purchase much more freely. Naturally prices have gone up. It is perhaps a question whether the rise has not very nearly reached its limit. It has very possibly now attained a point at which those who had steady employment or a fixed income in 1897, and whose results are now, if any, but little larger than they were then, must economize—that is to say, a very large class must buy less. In the absence of some scarcity due to a failure of production the slackening in demand will compel a reduction in price.

ALTHOUGH OTHER FACTORS

may in a particular case or at a particular time be so operative as to increase consumption when prices are rising or to increase it when they are falling, the rule remains true that other things being equal, the higher the price the smaller the consumption. It does not follow that it may not often be good policy for the manufacturer to mark up prices. Sometimes it may be even when there is no increase in the cost of production. Much more frequently it may be policy to retain prices at the level at which they have been, although there has been an appreciable reduction in the cost of making them. I mean that if it costs 50 cents to produce a particular article and you have been selling it at 60 cents, there are less objections to the policy of continuing to sell it at 60, although the cost of production has fallen to 45, than there there would be to raise it to 65 cents, while the cost of production remained at 50 cents. The reason is that few of those who buy from you know whether a price is high or not except by comparison with what the price has been. In actual experience it often turns out that they do not know even that much. A concern who bought largely from my company on one occasion bought a number of first grade Enameled Goods, goods that we call "first." They catalogued them as "firsts" and at a low price for "firsts," but could not sell them. In their next catalogue they changed their description of them to "seconds" and raised the price. Their customers thought that because they were classed as "seconds" they must be offered at a low rate, and they were sold promptly.

IT IS ESPECIALLY DANGEROUS

for any of the large corporations now called trusts to make a marked increase in the price of their products. Public attention, which could not be much concentrated upon the changes in price made by half a dozen or a dozen or more individual concerns, can easily be interested in an increase made by a single great corporation. We all remember the outcry which arose two years ago when the American Ice Company raised the price of ice in New York City and its neighborhood, and which has been raised this spring by the increase of the price of meats made by the so-called meat trust. The ice company and the Chicago packers each claim that the rise was due to natural conditions. I do not know whether it was or not, but then the people who raised the outcry do not know more than I do, and the outcry would have been just as great whether the claim of the sellers was or was not true. Such an outcry always reduces consumption. Many persons who would not think a second time over a rise of 2 or 4 cents in the price of a pound of meat had nobody else said anything on the subject, will endeavor very hard to cut down their meat consumption when every newspaper they see is talking about the extortion of the meat trust.

It follows, therefore, that in the case of large corporations an increase in price may be followed by a reduction in consumption greater than would be the result of a like rise in prices if the market was supplied by a number of independent concerns.

The lesson for such corporations, therefore, clearly is that their profits must be made rather by reduction in the cost of production than by an increase in the selling price.

HAVE COMBINATIONS AND CONSOLIDATIONS PROVEN BENEFICIAL OR DETRIMENTAL TO THE HARDWARE JOBBER?

BY F. P. MAY OF F. P. MAY & CO., WASHINGTON, D. C.

This is the question I am asked to present for debate at this meeting of our association.

Men have at all times shown a tendency to combine. Two or more individuals unite to form a firm; a number of men join to form a corporation, and corporations in turn bind themselves to form combinations.

Evidently the paramount object for combining is the attainment of increased strength. Now naturally we seek the motive for desiring greater strength. Is it to be enabled to carry out some laudable aim? Is it to be enabled to resist some formidable business adversary?

Or is it to be enabled to take undue advantage of our weaker fellow man?

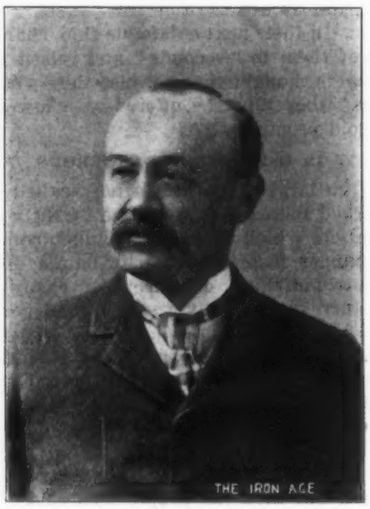
COMBINATIONS AND CONSOLIDATIONS.

To understand our subject clearly we must distinguish between combinations and consolidations.

A combination, I take it, whether in the nature of a pool, a trust or a mere agreement, is a union of a number of concerns, usually in the same line of business, associated together for some common purpose, wherein each component member retains his individuality. Whereas a consolidation is rather an aggregation of business interests, woven into one concrete whole, forming, in a way, a mammoth firm in which individual identity and responsibility are absorbed.

COMBINATIONS.

Let us first consider combinations. These mergers are born of an inordinate desire for gain, and, being of a temporary nature, thus enjoying but a short time during which to realize the excessive profits they set out to make, some, at least, seem to think the end justifies rather questionable means. Composed of concerns who, through lack of ability, standing or capital, are unable single handed to achieve their end, and being unwilling



F. P. MAY, F. P. May & Co.

to consolidate with their competitors, they enter into agreements and stipulate terms and prices that generally prove hurtful to the jobber's interests.

ADVANCING PRICES TOO RAPIDLY.

One of the evils practiced by combinations is the advancement of prices too rapidly and too high, thus encouraging fresh competition that leads to an irregularity in current prices. Then the jobber, fearing the inevitable fall in prices, hesitates to buy as liberally as his trade demands. And with this decline comes that consequent slackening of business, for experience has taught us all how difficult it is to sell on a despondent market. And when the bottom is reached the jobber is required to meet prevailing quotations, which means the selling of his goods at perhaps one-half their cost. He is then forced to resort to missionary work—soliciting orders, reassuring the dealers and generally stimulating trade among a class of timid buyers.

THE TACK POOL.

The working of the average combination is well illustrated in the first one with which I had to do. This was the Tack pool, formed a number of years ago, and composed, I believe, of five Tack companies. They purchased the patents on Tack machines, bound up the manufacturers of Tack plates with stringent contracts, obliterated competition and threatened one another with heavy penalties should agreements be violated. Having thus fortified themselves with every safeguard their cunning and cupidity could devise they felt so securely intrenched that they thought themselves irresistible and invulnerable. In one move they raised the price of Tacks about 100 per cent. Then the merry dance began, for their position was not as secure as they had supposed. Men with means and without started factories; some to enjoy the fat profits the pool made possible, others to be bought out at an extravagant figure. Thus was competition cutting them like a two-edged sword; on the one side carving large slices from their trade, on the other taking much of their profit to silence those not unwilling to sell out. The maintenance of the pool was found both difficult and expensive. Striving to attain their object, that of abnormal profits, prices were raised again and again, but without avail. The end at length came, and when the pool was dissolved and a reckoning made the parties to the scheme were none the richer, because all their earnings had been expended in efforts to buy off the competition that was springing into life on all hands. This trust, that seemed to some so rich in promise, was accorded a most disappointing failure, and where it had at the inception found but five manufacturers, as it gasped its last it left 40 in the field and the Tack business in a demoralized state.

The career of this pool reminds one of the flight of a rocket; there is a flash, a sizz and a whirr, and on its upward way it goes, throwing scorching sparks on all who happened in its way. But having finally spent its force, it bursts, and when all is over nothing remains but a mere burnt stick.

But the experience of others still fails to teach the many. The promoter enters upon the scene and the credulous manufacturer, blinded by the alluring hope of a fortune easily and quickly gained, tramples under foot the rights of his patrons and rides rough shod over those who for years may have been his loyal supporters.

REBATES.

We can all recall our dealings with manufacturers who, being inveigled into a trust, place the management of their business in the hands of an agent, who advances prices unreasonably high. This invites competition, which is bought up, and the cost of such purchases is added to the price of their output. This process is repeated until prices are raised so high that the jobber is required to sell his goods at near cost and the retailer is unable to gain a living profit. However, the magnanimous agent agrees to reward us for our good behavior by allowing a pittance, that will little more than cover the freight on the goods bought, providing we admit we are slaves to the combination by making a solemn declaration that we have purchased no goods such as are made by the trust from any one outside the compact. And this allowance, mind you, is conceded only at the expiration of six months from the date of the purchase and payment of the goods. Moreover, should we at any time wish to transfer our trade we must forfeit all premiums earned during the previous half year.

Trade, alienated by the immoderate requirements of a domineering trust, may at times in part be won back, but friendship crushed by such methods can never be revived. I cannot imagine anything more outrageous than a manufacturer dictating from whom the jobber may and from whom he must not buy his stock.

In the face of such treatment, with all its atendant evils, what shall we say? Are combinations beneficial or detrimental to the Hardware jobbers?

CONSOLIDATIONS.

Now, consolidations are founded on a different basis and have generally tended to our benefit. The promoters of consolidations, in their desire to assure their permanence, can ill afford to be influenced by greed or resort to oppression. They are forced to be liberal and must be guided by sane business principles. We may be seized with consternation upon hearing of a new consolidation being formed and amazed at the great line of figures required to represent its capital, and regret to learn of the aggregation of houses with whom we have long had dealings and whose names shall no more appear on our ledgers. But the organization is soon completed, annoying competition is removed, the quality of merchandise is improved—or at least made uniform—and while prices are advanced, they become stable and confidence is infused into a reinvigorated market. Goods are again freely bought, without temptation to overstock or fear of an early decline.

How long these colossal institutions will last I will not venture to state. But if they be cast in the proper mold they should repeat the history of some of the old establishments we have known so long and whose names we mention with so much pride—houses that are financially strong and noted for their honorable dealings; liberal, but not prodigal; dignified, but not arrogant; exacting, but not austere; a help to the struggling young beginner, a refuge for the older house in adversity. Indeed, like the pyramids of old Egypt, built on a foundation broad and ample, with a superstructure substantial, but plain; with outlines simple, yet attractive, and with head reared toward heaven, such an edifice should withstand the storms of time and ever hold the admiration of the world.

THE PROPER BASIS OF CREDIT.

BY J. NORMAN WILLS OF THE ODELL HARDWARE COMPANY, GREENSBORO, N. C.

In lower Broadway there stands a substantial building in which is housed a business which is a monument to the extraordinary sagacity and the indomitable energy of its founder. After two failures its proprietor furnished the world with one of the most striking of all the phenomena recorded in the history of commerce. His failure in one instance having been due to the abuse of the credit system, and in the other to an unwise partnership, he naturally sought, in making the third venture, to avoid the perils which he had encountered in his previous experience. At one time "cash before delivery" was his theory. It is a striking fact, however, that the succeeding years saw the principle of credit applied more largely to his business, until now the concern offer credit to all applicants who will meet certain simple conditions. These conditions, though simple, nevertheless form a more satisfactory basis of credit than many of our jobbers may hope to adopt. The applicant who wishes to "run an account" is required to give good security; and, further, to confine his demands for credit to an amount that is determined by the capital invested and the weekly returns to the house, who thus recognize the fact that credit is an indispensable factor in commercial transactions.

A GREAT AID TO INDUSTRIAL DEVELOPMENT.

There have always been some honest souls who have had a "holy horror" of debt in every form. The credit system has been charged with being productive of more evil than any other source of man's misfortunes and misery. They attribute the existence of credit to a desire on the part of many to live beyond their means, or to an undue haste to become rich, and an unwillingness to be content with resources already at hand. The credit system, however, is like almost everything else—it is subject to abuses, and, when abused, must bring misfortune. Properly employed, however, credit is a great aid to industrial development, a fact which becomes more apparent as we observe the progress of civilization.

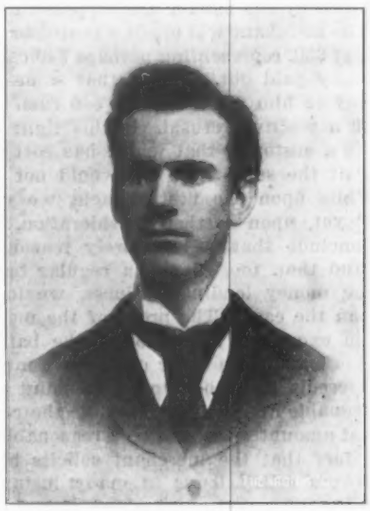
DEFINITION OF CREDIT.

Credit has been defined as the power to make use of another man's wealth, resting upon the fact that when one has more wealth than he proposes to use himself, he is ready, for a consideration, to lend it to another. While it may be for either production or consumption, the great function of credit in modern industry is to furnish the means for production to those who may be possessed of energy and ability, but who lack capital. It is based upon the eternal fact that men are dependent one upon another, and that "no man liveth to himself." It is the same principle as that which is demonstrated when a large land owner leases a portion of his estate to tenants who are to pay him a certain percentage of their crops. The large money holder lends to other producers a certain part of his wealth, that part which he is not able to employ himself actively, for purposes of production, and these borrowers agree to return it to him at a stipulated time with a consideration for its use. The large holder of goods lends to others portions of his stock, for which they are to pay him in current money at the end of a stipulated time, with a consideration for the use thereof, that consideration being the profit allowed in the selling price. The true function of credit is to furnish to producers a means for making or enlarging their production.

Credit, of course, is often used as a means of convenience, illustrated in the running of a monthly account at a retail store. It has been claimed that 60 days' credit was originally granted when transportation was slow, to allow the merchant time to receive and examine his goods. Likewise a credit transaction now frequently means merely time enough to allow the purchaser to receive and examine his goods when he remits less the cash discount. The fact, however, that he has the option of longer time and that the goods are sent him on trust places these transactions properly in the range of credit.

THE HISTORY OF CREDIT.

would be extremely interesting were the material at hand which would enable the recorder to compile it. We may believe that the first credit transaction took place at very near the time of man's creation. One is led to wonder, therefore, that it was seemingly unknown in cultured Egypt at the time that Joseph, whom our



J. NORMAN WILLS, Odell Hardware Company.

genial secretary has felicitously referred to as the "first jobber," was distributing the accumulations of the storehouses of Egypt to the famine stricken people. We would have supposed when the cash gave out that he would have sold on credit and taken a mortgage on the lands. We find, however, that he required the actual transfer of the lands to Pharaoh, and they were afterward leased to their former owners for a yearly rental. Perhaps, however, Joseph was making panic terms, and under normal conditions reasonable credit would have been extended on good security.

CHARACTER, CAPACITY AND CAPITAL.

There are represented in this association jobbers whose combined annual sales may be estimated at $15,000,000, at the very lowest, and I think it safe to say that not 5 per cent. of this business is done for cash, counting cash transactions as those in which money is passed at or before the time of delivering the goods. It is important, then, that we find the true basis of credit. I can think of no better way of expressing it than the one employed by Mr. Boocock of the National Association of Credit Men, who, in his address before this association a few years ago, quoted James G. Cannon of the Fourth National Bank of New York as saying that the true foundation of all credit is character, capacity and capital, and the greatest of these is character. It is indeed pleasant to exalt character, for if we appreciate mankind we must appreciate character, which may be defined as being what a man actually is. If we believe only, with Herbert Spencer,

that we are at all times in the presence of an enternal energy, then we can regard character as a manifestation of that eternal energy; but if we have learned to see in that eternal energy a loving Father and to regard ourselves as His children and all men as brothers, then we can truly exalt character, for it partakes of the divine. But, confronted as we are with every day conditions, having to deal with men who too frequently suggest anything but the divine, we must consider character in its proper relation to those other features which play an important part in every commercial transaction.

If credit is that by which one makes use of another's wealth for purposes of production, is not the true basis of credit his productive ability? His integrity of purpose must of course be assured, and a certain degree of capital is essential in almost every instance to one's having ability to produce. I take it, therefore, that when we have satisfied ourselves that the applicant for credit is possessed of integrity and has fair prospects of success by reason of the amount of capital contributed by himself, his business ability and a suitable environment, we may conclude that he offers the proper basis upon which any member of this association may extend credit.

MERCHANT AND BANKER.

The basis of credit recognized by the merchant and the one adopted by the banker are supposed to be quite different. The merchant will credit a customer for goods to the value of $50, representing perhaps $40 cash, which he has actually paid out. Yet, if that same customer were to apply to him for a loan of $40 cash he would be met with a positive refusal. Is this right? Should we intrust to a customer that which has cost us actual cash, while at the same time we would not lend him money? While upon the first thought we might answer "No," yet, upon further consideration, I believe we must conclude that it is entirely reasonable that we do so, and that, too, though a regular banker, engaged in the money lending business, would likewise refuse to loan the cash. The profit of the merchant is, of course, in excess of that allowed the banker, who must base his loans upon 6 per cent. per annum. The request for credit for goods to the amount of $50 is entirely reasonable and legitimate, while the request for a loan of that amount might not be a reasonable requirement. The fact that the merchant solicits his orders, while borrowers solicit loans in many instances, will account for the difference of standard, though it not infrequently happens that the banker likewise becomes a solicitor when his surplus is large or a desirable account is being sought.

THE CREDIT MAN.

This paper, I presume, could not be considered complete without some mention of the work of that important individual whom we know as the credit man. Did you ever see a real, live credit man? He belongs to an interesting, though not rare, species. I should like to make a tour of the country and seek out these individuals in their offices and see exactly the work undertaken by each and the methods employed to accomplish it. His work is primarily to ascertain whether applicants for credit are worthy, and, having decided in the affirmative, to watch closely for any indications of his having been mistaken, and to see that the contracts upon which he has based the credit are carried out. The ideal credit man is possessed of a cheerful disposition and has a healthy degree of confidence in his fellow men. He is willing to believe, as a principle, all men good until he has evidence to the contrary, but never shows his faith by extending credit until he is sure that there is proper ground for it. By this I mean that he should not be unduly suspicious, but hopeful, looking for the good in men, but quick to recognize indications of the bad. Having extended credit he should take the customer into his circle of friends and seek to know him as an individual. While he may not hope to become personally acquainted with even a small proportion of his customers, by observing the correspondence, by talking with the traveling men and taking knowledge of each transaction with the customer, as far as possible, he is soon able to form a fairly correct idea of him. He must remember that a man, to be successful, whether in religion, politics or business, must deal with the individual. His interests, therefore, should go back of the order and extend to the sales department. He should be in hearty sympathy with every department of the business, while not undertaking to acquaint himself with too many of the details. In the sales department he sees the medium through which the customers are sought out and their patronage continued. In the department of complaints or claims he should have more than a casual interest, because here frequently may be found the key to the customer's peculiarities. He should be in charge of the collection department and keep a close watch over every account. He should maintain a consistent attitude throughout. He may be thought too independent and inappreciative, especially by the traveling men, who see the orders which they have eagerly sought held up for investigation. A reasonable degree of independence is essential, however, even in selling goods, but he should not be exceedingly liberal when the order is secured, offensively independent when the bill is due and tyrannically autocratic when it has become past due. Under all circumstances he should be as prompt as circumstances will permit.

HIS METHODS.

As to methods, there is not a great deal to be said. In obtaining information it is best to use almost every source at command. The mercantile agencies and personal references are of value. I have found the reports furnished by attorneys who are under contract to answer inquiries, for which they in return are to receive collections direct, fairly satisfactory on the whole. The information furnished by a Trade Experience Bureau, such as the Credit Clearing House or the Bureau of Credits of Richmond, is perhaps the most satisfactory of all, though this is most valuable when used in connection with other reports. Much depends upon the impression which the customer has of the house. Is it not true that there are some houses for whose terms the debtor has no regard, while others he is especially anxious to pay on time? How can one be included in the latter class, and yet not have the customer, while preferring to pay him, likewise prefer to place his orders elsewhere? The first essential toward securing the regard of a customer for terms is for the house themselves to show a proper regard for them. A good way, I believe, is to send a statement the day the bill is due. This can be readily arranged by making out at the first of the month, not only the statements of bills that are due, but of others that will mature during the month, filing them according to dates and sending them out accordingly. It is likewise desirable in most instances to give a detailed statement of all bills which are due, although a statement may have been previously rendered, and not simply begin with "Balance rendered." In some instances it is not necessary to repeat items of which statement has been rendered previously, but as a rule it is best, especially in the case of past due bills. The customer whose bill has become past due and who pays no attention to letters or drafts should have his name transferred to a card, filed in a proper index. All letters from the debtor and carbon copies of those addressed to him may be kept in a folder for ready reference, while another card index in which the cards are arranged according to dates will enable the credit man to keep track of promises.

It is important that the customer should be reminded of every unfulfilled promise. As to what methods must be employed in case the ordinary fail, and when these should be employed, I shall not undertake to say. Again the knowledge of the individual case must be brought into play, and the method used which suits the case. The collection of a bill that is past due should be urged systematically, and each step taken should be in advance of the previous one. It is useless, as a rule, to write a persuasive letter, make a draft which is allowed to be returned, write a threatening letter, and then begin over again and write another persuasive letter.

Finally, to the credit man, do not be over cautious. There is more money made in jobbing Hardware where the bills are as a rule small, by taking risks, than by shunning them too carefully. The credit man who is careful in his investigations and diligent in following up

each transaction may safely hope to show a minimum amount of business lost on account of orders turned down, and at the same time a minimum loss account when he makes up his annual statement.

Membership of the Association.

ALABAMA.

Anniston Hardware Company, Anniston.
Echols-Smith Hardware Company, Birmingham.
Mayberry Hardware Company, Birmingham.
May & Thomas Hardware Company, Birmingham.
Milner & Kettig Company, Birmingham.
Moore & Handley Hardware Company, Birmingham.
Paden-Ewing Hardware Company, Gadsden.
Cunningham Hardware Company, Mobile.
D M. Snow & Co., Montgomery.
G. W. Barnett & Son, Montgomery.
Teague & Sons, Montgomery.
Tullis Hardware Company, Montgomery.
Allen & Jemison Company, Tuscaloosa.

ARKANSAS.

Atkinson-Williams Hardware Company, Ft. Smith.
Ayers & Co., Ft. Smith.
Speer Hardware Company, Ft. Smith.
W. W. Dickinson Hardware Company, Little Rock.
Fones Bros. Hardware Company, Little Rock.
Fox Bros., Pine Bluff.

DISTRICT OF COLUMBIA.

F. P. May & Co., Washington.

FLORIDA.

Florida Hardware Company, Jacksonville.
S. B. Hubbard Company, Jacksonville.
Knight & Wall Company, Tampa.

GEORGIA.

Athens Hardware Company, Athens.
T. Fleming & Sons, Athens.
Deveney, Hood & Co., Augusta.
Maurice Walton Hardware Company, Augusta.
Anderson Hardware Company, Atlanta.
E. C. Atkins & Co., Atlanta.
Beck & Gregg Hardware Company, Atlanta.
Dinkins & Davidson, Atlanta.
King Hardware Company, Atlanta.
Dunlap Hardware Company, Macon.
Griffin Hardware Company, Rome.
Rome Hardware Company, Rome.
Edward Lovell's Sons, Savannah.
Palmer Hardware Company, Savannah.
J. D. Weed & Co., Savannah.

INDIAN TERRITORY.

Turner Hardware Company, Muskogee.

LOUISIANA.

A. Baldwin & Co., New Orleans.
Stauffer, Eshelman & Co., New Orleans.
W. A. Pleasants Hardware Company, Shreveport.

MISSISSIPPI.

Baker & McDowell Hardware Company, Natchez.
Louis Hoffman Hardware Company, Vicksburg.

NORTH CAROLINA.

Charlotte Hardware Company, Charlotte.
J. H. Weddington & Co., Charlotte.
Odell Hardware Company, Greensboro.

SOUTH CAROLINA.

Marshall, Wescoat & Co., Charleston.

TENNESSEE.

Mitchell-Powers Hardware Company, Bristol.
Tom Fritts Hardware Company, Chattanooga.
Magill Hardware Company, Chattanooga.
S. B. Luttrell & Co., Knoxville.
C. M. McClung & Co., Knoxville.
Woodruff Hardware Company, Knoxville.
E. C. Atkins & Co., Memphis.
Orgill Bros. & Co., Memphis.
Thomas, Barnes & Miller, Memphis.
J. H. Fall & Co., Nashville.

TEXAS.

Ed. S. Hughes & Co., Abilene.
Moroney Hardware Company, Dallas.
F. W. Heitmann & Co., Houston.
Bering-Cortes Hardware Company, Houston.
H. S. Bettes Hardware Company, Paris.
Elmendorf & Co., San Antonio.
Roberts, Sanford & Taylor Company, Sherman.
McLendon, Duncan & Co., Waco.
R. E. Bell Hardware Company, Weatherford.

VIRGINIA.

Piedmont Hardware Company, Danville.
Barker-Jennings Hardware Company, Lynchburg.
Clark Hardware Company, Lynchburg.
Paul R. Howard Hardware Company, Norfolk.
Watters & Martin, Norfolk.
Charles Leonard, Petersburg.
W. S. Donnan & Co., Richmond.
Watkins-Cottrell Company, Richmond.

MORLEY BROS'. NEW WAREHOUSE.

SOME time ago Morley Bros., Saginaw, Mich., who own what is known as the Commercial Block on Tilden street, purchased lots still further south of the buildings, located between Germania and Janes avenues, on the river front, and an architect is now preparing plans for a large warehouse, which the firm propose to erect on the property. The building is to be 100 x 300 feet, and two stories high. It is to be constructed of brick and in a very substantial manner. Railroad tracks are to be laid alongside the building and the facilities for handling the large business of the house will be equal to the requirements, so that orders can be taken care of expeditiously. Morley Bros. are also to make extensive improvements to the dock frontage of the property owned by the firm on South Tilden street. The firm, we are advised, have just shipped a general bill of Builders' Hardware to Erzeroum, Asiatic Turkey.

CORRESPONDENCE.

To the Editor: In the last issue of *The Iron Age*, mentioning the election of officers of the Minnesota Retail Hardware Dealers' Mutual Fire Insurance Company, you credit the vice-president to Minneapolis. By St. Paul this will not do. Twenty-one years in the Hardware business in this city makes me a St. Paul man.

Yours truly,

J. F. McGUIRE.

ST. PAUL, MINN., June 7, 1902.

THE AVERY STAMPING COMPANY, Cleveland, Ohio, call attention to their ability to perform drawn, dished, flanged, pressed, sheared and intricately shaped Sheet Steel Work of almost any description. They have been in the general metal working business 17 years, during which period machinery and appliances that would serve to facilitate and improve have constantly been added, until at the present time they own a very complete and efficient equipment of hydraulic drawing and blanking presses of enormous power, shears, flanging machines, punches, &c. They make a very large variety of special articles, such as Seamless Steel Tanks for automobiles or for holding all kinds of fluids and gases, Cylinders and Shells, for which they also make heads and bottoms; Heavy Pans and numerous other vessels, Sketch Plates, 18 gauge and heavier, especially of small dimensions, all furnished promptly according to specifications. Standard and Special Washers are also made.

THE CAMILLUS CUTLERY COMPANY, Camillus, N. Y., owned and operated by Adolph Kastor & Bros., 109 Duane street, New York, have increased the capacity of the plant by recently adding a factory building, 150 x 50 feet in dimensions, the original works, which have been in operation 18 months, covering a site 100 x 50 feet. Only pocket and pen knives are made at this factory. The firm of Adolph Kastor & Bros. deal largely in various kinds of cutlery brought into this country from abroad, a business they have carried on for many years, but they recognize a demand for certain grades of American cutlery which it is their purpose to adequately supply by increasing their facilities. In this connection we are also advised that on May 31, 1902, they took into the partnership their brother, August Kastor.

THE ATLAS PAINT & SPECIALTY COMPANY, 433-435 Pearl street, Cincinnati, Ohio, are successors to the Frank Happell Mfg. Company, manufacturers of high grade paint specialties. Jet-E-nam, their principal brand, is an enamel for producing a permanent jet black on bicycles, radiators, ranges, stove pipes, mantels and grates, and, it is claimed, is not affected by heat or cold. They report an excellent demand for their various specialties.

A THREE-DECKED TABLE.

A THREE-DECKED TABLE, such as is shown in the accompanying illustration, is in use in the store of John S. Parsons, Unionville, Conn., for showing novelties and cheap articles. A molding is placed around the

A Three-Decked Table.

edge of each deck so as to prevent small articles from rolling off. A table of this character enables a large variety of goods to be shown in a small space, and its use is worthy of the consideration of merchants who desire to push this class of articles.

THE Danish watchmakers, Arp & Jensen, are manufacturing a Bicycle Stand, which is hinged to the front fork of the frame, so that when brought down it supports the Bicycle in an upright position. When not in use the contrivance is folded alongside the fork and is nearly invisible. When the Stand is in use it may be locked by any convenient means, making it impossible to ride the Bicycle and providing against its theft. Patents have been secured in most civilized countries. Those desiring further particulars may address A. M. Held, engineer, Copenhagen.

M. S. MATHEWS, 323 Boston Block, Minneapolis, Minn., has been appointed secretary of the Minnesota Retail Hardware Association, succeeding the late Thomas McCracken. Mr. Mathews has also been chosen secretary of the Minnesota Retail Hardware Dealers' Mutual Fire Insurance Company.

UNDER date 16th inst. the Yankee Company, manufactures of the Yankee Nail Puller, announced that they have sold their business to the Smith & Hemenway Company, 296 Broadway, New York, including contracts, patents, good will, machinery, tools, &c. The latter company will continue the manufacture of the goods and solicit the favors of the trade.

THE J. A. HARPS MFG. COMPANY, Greenfield, Ohio, are now manufacturing the Never Fail Can, having purchased the interest of the former maker, C. W. Price. The Can is designed for oil or gasoline, a peculiar feature in its construction being that the oil does not touch the inside of the can pump.

M. S. BENEDICT MFG. COMPANY, East Syracuse, N. Y., manufacturers of Silver Plated Ware and Metal Goods, have opened a salesroom at 1016 Walnut avenue, Kansas City, Mo. This branch will be under the management of E. E. Richards.

THE JAMES C. LINDSAY HARDWARE COMPANY of Pittsburgh have decided to increase their capital stock from $150,000 to $250,000.

CONTENTS.

	PAGE.
Dome of the New Chicago Government Building. Illustrated	1
Lake Iron Ore Matters	2
The Largest Cantilever Bridge	2
The College Man in Industrial Works	3
The Molding Machine. Illustrated	4
Central Pennsylvania Industrial Notes	7
The American Society for Testing Materials	8
Solid Rolled Steel Wheels	14
A Shop Foundation on Made Ground. Illustrated	14
Stamp Mill Shoes and Dies	14
The Metallurgy of the Cupola	15
Niagara Falls-Toronto Power Transmission	17
Some Methods of Increasing Foundry Production	18
The Fuel Briquetting Industry in the United States	19
The Growth of the Dominion	22
Notes from Great Britain	23
Shipping and Shipbuilding in Scotland	24
A Dinner of Welcome to O. P. Letchworth	25
Dominion Steel Company Take Over Dominion Coal Company	26
The Effect of Melting Steel with Iron in the Cupola	27
Drawback on Structural Material	27
Suggested British Standardization of Pipe Flanges and Flanged Fittings	28
The Harbison-Walker Refractories Company	28
Trade Publications	29
The Iron Industry in Australia	29
Oil Fuel in the Navy	30
Kirby-Williams Company	30
Editorials:	
The Danger of Continued Flotations of Industrial Securities	31
Small *versus* Large Appliances	31
Immigration Heavily Increasing	32
Correspondence	32
The American Foundrymen's Association	33
Personal	36
The Richmond Company	36
The Foundrymen's Association	37
The Portsmouth Steel Company	37
The Worcester Machinists' Strike	37
The Molders at Pittsburgh	37
Manufacturing:	
Iron and Steel	38
General Machinery	38
Boilers, Engines, &c	39
Foundries	39
Fires	39
Hardware	39
The Sheet Mill Scale Settled	40
The United States Shipbuilding Company	40
The Iron and Metal Trades:	
Comparison of Prices	41
Chicago	41
Philadelphia	43
Cincinnati	44
St. Louis	44
Birmingham	45
Pittsburgh	46
Cleveland	47
French Iron Market	48
New York	48
Metal Market	49
Iron and Industrial Stocks	49
No Crucible Steel Combine	49
The New York Machinery Market	50
Morgan Engineering Strike Settled	50
The Chicago Pneumatic Tool Company	50
The Pottsville Iron & Steel Works	50
Hardware:	
Condition of Trade	51
Notes on Prices	53
Requests for Catalogues, &c	55
A Rack for Balls of Twine. Illustrated	55
A Baseball Bat Rack. Illustrated	55
Southern Hardware Jobbers' Association. Portraits	56
Morley Bros.' New Warehouse	67
Correspondence	67
A Three-Decked Table. Illustrated	68
American Hardware Manufacturers' Association. Portraits	69
Nebraska Retail Hardware Dealers' Association. Portraits	76
Export Club of America	77
Conjectures About Jobbing Consolidation	78
Trade Items	78
Notes on Foreign Trade	79
New York State Hardware Jobbers' Buffalo Meeting	81
Van Voorhis & Sanford's New Catalogue	81
Death of Thomas McCracken. Portrait	82
Hardware Store Window Display. Illustrated	82
Kelley-How-Thomson Company	83
Tool Cabinets. Illustrated	84
Among the Hardware Trade	85
The New Goodrich Ball Bearing Sewing Machines	85
Price-Lists, Circulars, &c	85
Miscellaneous Notes:	
Dayton's Fly and Mosquito Killer	85
New Curry Comb Finishes	86
E. C. Tecktonius' Specialties	86
Railroad Ticket Punch. Illustrated	86
Rubber Heels. Illustrated	86
Ideal Removable Platform and Striking Bag. Illus	86
The Universal Cotton Jacket. Illustrated	87
The Soldiers' Friend Camp Bed. Illustrated	87
The Navajo Cow Bell	87
The Plumbers' Hollow Mill Saw. Illustrated	88
The Easy Lawn Mower Grinder. Illustrated	88
Meyer's Removable Steel Calk Horseshoe. Illustrated	88
The Lane Hinged Door Hanger. Illustrated	89
The Tokheim Measuring Pump. Illustrated	89
The Iver Johnson Junior Single Gun. Illustrated	90
The Automatic Oiler. Illustrated	90
The Melchior-Kade Adjustable Brackets. Illustrated	90
Current Hardware Prices	91
Current Metal Prices	98

American Hardware Manufacturers' Association.

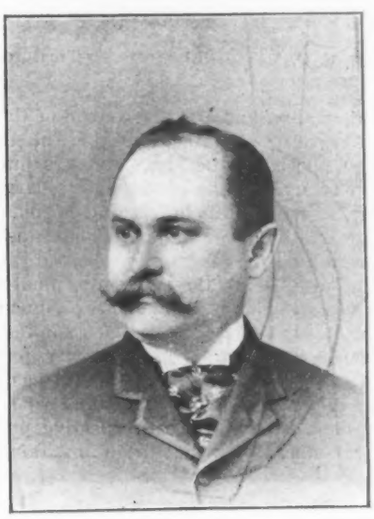
SECOND ANNUAL CONVENTION.

THE second convention of the American Hardware Manufacturers' Association, being the first meeting since its organization last October in Cleveland, is now in session at the Marlborough House, Atlantic City.

Inasmuch as many of the manufacturers and their representatives have been in the habit of attending the meeting of the Southern Hardware Jobbers' Association and of the National Hardware Association, which are regularly held in June and November respectively, it was decided that the meetings of the manufacturers' association should be held simultaneously. The wisdom of this is indicated in the conventions now being held, which not only bring together a large number of both jobbers and manufacturers, but give them admirable opportunities for conference. The result is a very satisfactory gathering of merchants and manufacturers.

Excellent arrangements had been made for the meeting under the especial direction of the Executive Committee, with Robert Garland as its efficient chairman.

The Membership Committee, too, gave good account



FAYETTE R. PLUMB, President.

of themselves, the membership of the association having increased to 146, including, as the names show, many of the most important houses in the trade.

The Reception Committee, under the leadership of Henry B. Lupton, did most efficient work in looking after the welfare and comfort of the association and their friends, the jobbers.

TUESDAY'S SESSION.

Only two meetings are provided for in the programme, one on Tuesday and the other on Thursday morning, at the hours during which the jobbers are in executive session. The opening meeting on Tuesday afternoon was largely attended, many representative manufacturers being present, and the whole constituting an imposing representation of Hardware manufacturing interests.

An admirable address was made by Fayette R. Plumb, president of the association, in which he referred briefly to the objects of the association, expressing the belief that notwithstanding diversity of interests there were matters of importance in which they had ground on which they could stand together. He referred especially to the extent to which contracts had become scarcely more than options, so far as the pleasure of the buyers was concerned, and to the abuses connected with cash discounts and special brands. In connection with the last he read with approval comments made by *The Iron Age* in which the abuses connected with the practice of making special brands for the jobbing trade were pointed out.

The convention then went into executive session,

SAMUEL M. NICHOLSON, Vice-President.

when the work of the association was taken up in more detail, as the reports of committees were received and communications considered. Some interesting discussions were thus developed.

One of the topics considered was that of syndicate buying, to which, in some of its features at least, a good deal of opposition was developed on the part of the manufacturers.

The desirability of the purchasers instead of the manufacturers determining the routes for shipment of goods was brought before the convention in a communication and some discussion resulted.

C. S. VAN WAGONER, Vice-President.

Both of these subjects were taken into advisement

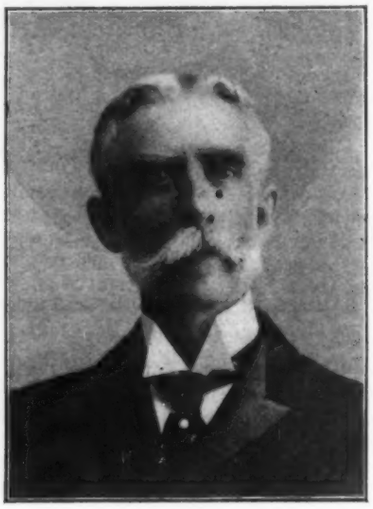
to come before the manufacturers for their future consideration.

The session made an excellent impression on those present in regard to the practicability of the association doing something to correct trade abuses and in various ways to advance the general interest.

CONTRACTS—ARE THEY MUTUALLY BINDING AS NOW INTERPRETED?

BY F. S. KRETSINGER, PRESIDENT OF IOWA FARMING TOOL COMPANY, FORT MADISON, IOWA.

I have been requested to address you on the subject of "Contracts—Are They Mutually Binding as Now Interpreted?" Now lest you attach too much importance to the word "address," let me say at the outset that my remarks can hardly be classed under that heading, but rather let me ask your indulgence a few moments while I comment on a few points in which, in a measure at least, I hope you may concur. I am fully conscious that I may pass by matters of as much importance as those which I mention, and which naturally come under the subject given me, but with a fixed desire to be brief, I will allude only to such incidents as have particularly



F. S. KRETSINGER, Vice-President.

come in my experience as a manufacturer and seller. I ask for leniency should I fail to keep within the bounds of generalities, for the willful violation of contracts without substantial reason, apology or excuse is, as you all know, not simply disappointing and aggravating, but frequently a gross injustice, besides working a great hardship, and altogether exceedingly exasperating.

I shall assume all the time that we have in mind written contracts, for verbal ones covering transactions of importance are unreliable and unsatisfactory, for memory is often treacherous, however well meaning the individual may be.

A commercial transaction of sufficient significance to justify the title of contract should be, and as a rule is, something more than an agreement. It should cover the essential element or factor of consideration, in which both parties to the deal participate, though it may be in unequal proportions, and although it may not be equally satisfactory or profitable. This element of consideration lifts it above an ordinary off-hand purchase and sale; emphasizes its character and gives it a legal standing desired by both parties to it.

A contract is not made in an idle moment, nor as a matter of pleasure, nor as a special favor on the part of one toward the other party, but is entered into in earnest—strictly as a matter of business, with a feeling on each side that he is willing and desirous of parting with his commodity, be it cash, merchandise or material, and receiving in exchange, under stipulated conditions, what he regards as a satisfactory equivalent.

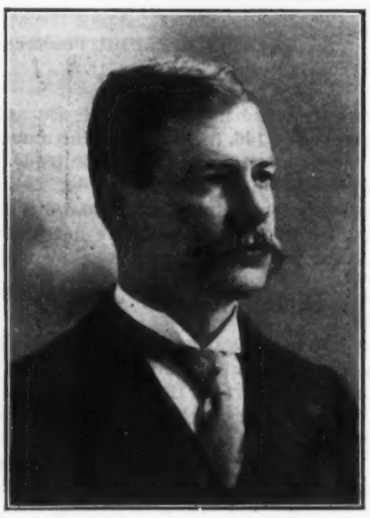
CONSIDERATION.

The purchaser may look for consideration in his success in securing a particular make of material or goods, a special brand, pattern or finish. The good reputation of the article, its quality and its price, time of payment,

F. D. MITCHELL, Secretary-Treasurer.

freight allowance, and also the control of that particular make (if merchandise) in his market—all these tend to invite the purchase. Besides, he takes into consideration the character of the concern he is bargaining with, its ability to execute his orders and its manner of dealing. These, in whole or in part, constitute his consideration for making the contract.

On the other hand, the seller may find his consideration in disposing of so much of his product in a market which he desires to retain or secure a foothold in, or the character of the order as to quality, patterns, sizes, &c., and the date of shipment; he also has in mind the standing of the concern he is dealing with, the matter of price, and naturally the prospective profits. These may be taken as his consideration in making a contract.



ROBERT GARLAND, Chairman Executive Committee.

To men naturally inclined to be upright in their dealings, a contract is but a concise memorandum of stipulations discussed and after more or less giving and taking finally concurred in, and the details put in writing for their mutual convenience—to save misunderstandings and to enable others, those, for instance, in the ship-

ping, invoicing or collecting branches of their respective businesses, to carry to a conclusion.

Taking it for granted that in the main, at least, my analysis of a contract (which is almost of daily occurrence with every business man) is correct, it stands to reason that its parties—buyer and seller—entering into such relations, are equally and honorably bound to respect its conditions. If either participant in the deal is not seriously in earnest, why should he waste, and worse than waste, his time and that of the other party to enter into it? A divergence of either one from the lines laid down in the contract invariably and unavoidably creates friction, generates suspicion, and naturally puts the other one on his guard during the existence of the current deal, and also places him on the defense in making any deals in the future.

VIOLATION A DANGER SIGNAL.

Furthermore, a violation of specific conditions is trifling with a serious matter, and indicates a premeditated intention to be dishonest, clouds the sense of honor, encourages like efforts toward others, and in time may prove an expensive procedure by fastening on the violator a reputation undesirable even to a calloused person, and which would stand as a danger signal to others with whom he might have business dealings, for the spreading of information of unfair and dishonorable actions is in these days of consolidations and

WM. H. HAYS, Chairman Membership Committee.

associations an easy matter and a legitimate means of defense.

Whether "contracts are mutually binding as now interpreted" is somewhat of a conundrum; I might almost and am half inclined to ask you to give me an easier one.

MOST CONTRACTS INTERPRETED CONSCIENTIOUSLY.

Sometimes I think it is unqualifiedly true that all men are liars (except, of course, our own particular selves), and yet, remembering the large number of contracts that are made daily; their varied conditions and the human and, I might almost add, the inhuman nature of men one has to deal with, I am inclined to think that in the great majority of cases contracts in their essential features are interpreted conscientiously—it may be because it is to the interest of the parties; be that as it may—all are not guided by the same motives—it is more than half way true that they are regarded as mutually binding.

The producer of material a few removes from the ore and the stump, to whom most of us look for a large part of our supplies, has occupied during the few recent years a peculiar, somewhat independent and yet trying position. A gradually rising market has stimulated trade, overloaded order books and made buyers unusually urgent as well as extremely solicitous.

SLOW DELIVERIES.

Sales undoubtedly have been made and quite generally, too, considerably in excess of the plant's capacity, and the slow deliveries have seriously inconvenienced buyers who have required the material for the employment of their shop hands, causing not simply extreme annoyance, but also in some cases serious losses.

OLIVER WILLIAMS, Chairman Grievance Committee.

In addition to this, the seller has put himself in a position of distrust, and encouraged feelings of suspicion that the older contracts at comparatively low prices have been neglected and that later contracts, at considerably higher prices, have had more careful and prompt execution. How far this is true cannot be demonstrated, but the age of many requisitions which our buying department have on file reminds us of their neglect and invites the question whether contracts are regarded by the sellers as mutual, or only as a convenience to themselves.

The manufacturer—one who buys various kinds of

H. B. LUPTON, Chairman Reception Committee.

partly made material, and with labor, machinery, &c., combines them to produce a finished article ready for use—is naturally influenced in his views of a contract by certain patent facts: he may have to purchase materials in large quantities, and to make contracts many months in advance of his needs to make certain of having the wherewithal to run his shops steadily and to advantage; he must have a complete assortment of materials

and in the right proportion, for a surplus of one kind or several kinds may be of no use to him if he is short one single kind. He may be disinclined to change his source of supplies where the material has worked to his satisfaction and which his shop or mill hands have manipulated successfully—a change might be taking too many chances, and possibly might be disastrous.

These things induce him to enter into and depend on specific contracts in his purchases, and what with the lawful nature of the transactions, what he knows or believes the other party to the contracts will look to him for, aside from his own sense of self respect, encourage him to be mindful of his duty, and combine, in my judgment, to entitle him to a vote of confidence.

In his relations with the trade he is impelled to ship goods satisfactory in quality, finish, &c., as a matter of good policy, and to retain his reputation, even though he may overlook the question of integrity.

EXECUTION OF ORDERS.

As to the execution of orders. Experience has taught him that prompt shipments induce duplicate or sorting up orders, and that it is to his interest to make shipments within the time promised, not simply to please his customers, but because he well knows that a delay or a late shipment will unavoidably restrict the sale of his goods by his customer, besides creating ill feeling which cannot always be overcome, even though he may have fair and reasonable excuses.

He has many obstacles to contend with that are beyond his control; such as obtaining, as required, fuel and material of various kinds, in which there may be hindrances, such as breakdowns in mines or mills, floods, fires, train wrecks, labor differences, &c.

Regardless of all these influences and the opportunities for excuses, they answer only in a measure for his nonfulfillment of a contract, for it is his plain duty, and his interest too, to anticipate his requirements and provide, within a reasonable degree, against such contingencies. If he fails in any measure to guard against such conditions, he neglects his duty, and is deserving of censure equally with those who show a disregard of other conditions in a contract.

PLAYING BOTH ENDS.

Looking at the question from the standpoint of the seller, with an experience with the trade dating back more than a quarter of a century, I am very glad to answer the question whether "contracts are mutually binding as now interpreted" in the affirmative, so far at least as a large majority with whom we have business relations are concerned, and, generally speaking, referring particularly to those who are the largest purchasers—representative houses in their particular localities. There are notable and most offensive exceptions, and the number is very much larger than it should be. There are certain buyers who, after entering into a contract to take a certain quantity of material or merchandise and to furnish detailed specifications within a certain time, will partially or wholly violate the contract, use the prices to break down the prices of another seller who, though your competitor, may be your warm personal friend; you may have conceded extreme and special prices and terms, granted him exclusive sale in his particular market, gone so far as to supply him gratis with catalogues and other advertising matter with his name and address on, citing perhaps the exclusive sale feature of the deal. All these make no difference and are given no thought by this one, whose moral standard is low and who thinks that the end justifies the means.

Believing that the contract was entered into in good faith, that it was mutually binding, you may have declined an opportunity to sell another as good or possibly even more desirable purchaser. You leave the field with a feeling that you have secured or retained that particular section to take a portion of your product, and then later you find yourself tricked. It is too late to get back and look up a new customer, and the only satisfaction you can get out of the situation is to make a record of the facts in the case and be on your guard in future dealings with this party. Or this buyer may think he is half way honest—as if there was or could be such a place for a man to stand on—and so takes a portion of the goods, claiming, if he honors you with any reason at all, that dull trade will not warrant him in taking the full contract quantity; when, did you know all of the facts, you would find that he is dividing his trade, violating contracts with both sellers by taking from each, not only a smaller amount than agreed on, but at a less price than either single purchase would have given him.

TAKING ADVANTAGE OF PAYMENT CONDITIONS.

There are some who, though they respect the conditions of a contract in taking material or articles purchased, resort to petty, discreditable means in payment conditions, thereby gaining a few cents, or possibly a few dollars, but as against this storing up a reputation for a loose idea of equity and fairness. They take more than the agreed time and refuse to pay interest, or they send a local check instead of sending a draft or a check on a bank in a recognized money center; and again, instead of earning the amount of cash discount, and which is essentially a premium for payment within a short and stipulated time, they let that period of 10, 20 or 30 days, as the case may be, pass over and then deduct or keep back a sum which they have not earned, are not entitled to and have no more right to retain than they would have to withhold the whole amount of indebtedness. They take that which does not belong to them without a good excuse and without a pang of conscience, contenting themselves with the thought that their trade is too valuable for the other party to positively refuse to allow the reduction, thereby classing themselves as highway (though petty) robbers, or at least proclaiming their low standing of manly dealing and a disjointed conception of what is right.

Every merchant or manufacturer has had in a greater or less degree the same experience—has been equally vexed or disappointed and has almost lost confidence, or at least had his faith weakened, in human nature. In these times it is imperative that systems and fixed rules should be used in the successful management of any business, and the religious adherence to contract obligations should be included among these, whether as buyers or sellers. Let the parties work in harmony and show clearly an intention to act in good faith, applying more the rule of good fellowship and less the rule that might makes right.

THE REMEDY?

Coupled with these accusations naturally arise the questions: Where is the remedy? How to eradicate and prevent a recurrence of the evil? How far is it prudent to go in making public misinterpretations, even where indisputable, defined instances occur? Public sentiment is a forceful agent in correcting evils and restraining evil doers, and it is possible that an open, frank discussion of the subject by the members of the various associations may lead to a reform, for the knowledge that disreputable methods may be brought to light and result in serious disadvantage to the ones at fault may measurably check the curse and should have a deterring influence, even though its moral aspect is ignored.

If the great majority of buyers and sellers willingly respect themselves by carrying out their arrangements in good faith, should not the small minority be made to do so?

Leniency and liberality are fairly due where sufficient and consistent reasons are given for inability to live strictly up to one's obligations or to justify modifications of contract conditions, but every well meaning man owes it to himself to be conscientious as a matter of decency besides as a matter of good business policy. A fixed determined plan to gain by intentional violations or neglect to respect agreements is contemptible and discreditable and can find no justification.

The sooner such men, no matter what industry, no matter whether their business is large or small, whether they are producers, consumers or middlemen—the sooner they are bulletined and their methods advertised and made public, so much the better for the protection of those who may desire to have future dealings with them.

Let the buyer be as close or as honestly shrewd as he

may be; let him squeeze the last 1 per cent. extra discount so long as the deal is a clean one; but when the contract is made in accordance with the understanding, then let it stand as a definite, unalterable law to guide the parties to it.

THE PROBABLE EFFECTS OF MERCANTILE CONSOLIDATIONS.

BY W. M. PRATT OF GOODELL-PRATT COMPANY, GREENFIELD, MASS.

I am a little in doubt as to the motive by which your committee was actuated when they invited me to address you upon this subject. The first sensations that I experienced were pleasant ones, fully appreciating the courtesy extended, but the more I studied the subject the more doubtful I became as to whether or no it was entirely a matter of compliment. I was half inclined to the opinion that, appreciating the importance of having something said relative to mercantile consolidations, and realizing that it was not as simple perhaps as it looked, they had picked upon some one who would be sufficiently susceptible to accept their very flattering invitation, and I was reminded of the story of a gentleman, who, while strolling through the streets of London, noticed somewhat in advance a diminutive maiden clad in her best bib and tucker standing in front of an iron gate and looking wistfully up and down the street. As

W. M. PRATT.

he approached she accosted him with a "Please, mister, won't you open the gate for me?" His family having always been noted for their chivalry, he could not well decline, and, opening the gate, was surprised to think that she should have required any assistance. Thereupon he made bold to ask her why she wanted him to do it; she looked up at him, saying: "Please, mister, it's just been painted, and I don't want to make my hands dirty."

Now, gentlemen, this subject of mercantile consolidations has been covered with so much paint during the past few months, not only in the brilliant hues of the yellow journals, but in the more somber shades of the press at large, that your committee, who were drafted, as I understand it, especially to attend to this matter themselves, are not to be severely blamed for looking for a substitute.

A mercantile consolidation is oftentimes confounded with the so called associations, combinations and trusts which have many times been formed and to no great good. While it may be one and all of these, it is not necessarily so; the latter exist oftentimes because of agreement only; the interests and units of which they are composed, while temporarily adherent, are not necessarily coherent and unified, as they should be. You will please bear in mind, therefore, that I am dealing solely with mercantile consolidations, which means in plain English many concerns made into one, and in the course of my remarks I shall not give the feature of overcapitalization more than a passing notice. I fully realize the danger therefrom and that we must expect more or less serious results; still if consolidations of this nature are to play an important part in the commercial history of the future, as I believe they are, the fact that they were overcapitalized at the outset will be merely an incident.

For the past 100 years or more every department of commerce and industry has been undergoing an evolution; within the past decade the changes have come so thick and fast that it has required all the ingenuity, brains, foresight and nerve energy of the present day American to keep apace with them; in every mine, in every mill, in every workshop the processes are continually changing, and everywhere per man and per machine our product is far in advance of what it has ever been before.

WRONG PRINCIPLES OF DISTRIBUTION.

Now while carrying out this economic policy in our departments of production, which we have raised to a higher standard of efficiency than was ever dreamed of in the past, we have neglected, so to speak, to inaugurate an equally economic and satisfactory policy in our methods of distribution; we have been studying to produce wisely and well; we have not taken the precaution to fortify ourselves in the field. I do not mean that our selling departments have been inefficient; I do not mean that we have not put forth every energy to place our product in the markets of the world; I don't mean that we have left a single stone unturned whereby we might have been able to further our interests in this direction, but I do mean that the underlying principles are entirely wrong.

We have been in the habit of adopting a cutthroat policy, so to speak, with our competitors; we have deviated entirely too far from the live and let live plan; we have not been satisfied with our share, but have been determined to get the other fellow's share as well, and with the first weakening of the market, with the first signs of a business depression, there has been a wild scramble for trade; prices have been slaughtered, lines have been unwarrantably extended, previously unproductive territory has been ransacked and the markets glutted regardless of price.

From the effects of this demoralization it has taken years to rally, and the deadly fear of its recurrence has continually retarded our recovery. These periods of depression have invariably been followed by periods of prosperity, and while experience should have taught us the lesson so thoroughly that our commercial and industrial equilibrium might have been preserved, it has so far failed to do so; now, to-day, in the early dawn of the twentieth century, which, could it have been depicted to our forefathers, would have appeared little short of a miracle to them, and while riding on the crest of a wave of prosperity the like of which has never before touched American shores, is it to be supposed that we should be content to let well enough alone and not endeavor at least to guard against a possible recurrence of the dangers and disasters which have so often followed our prosperous eras in the past? Most certainly not.

ASTONISHING THE WORLD.

We are facing to-day peculiar conditions, and the aggressive policy of the American producer is astonishing the world. Everywhere are old factories being doubled and new factories being built, assortments are being broadened, new lines brought out, and this great mass of energy has wrought itself into a mighty dynamo of human activity, the sparks from which have penetrated every nook and corner of the globe.

The policy of aggression has gone on by leaps and bounds; our avenues of distribution have been multiplied, until every city, town and hamlet has been canvassed and recanvassed, over and over again; we have poured millions into advertising matter and scattered it all over the world; we have spent money with a free hand in order that the American producer and his wares might not for one moment be lost sight of. Now while not questioning this policy of aggression and dissemination under such conditions as now exist, it is sometimes difficult to draw the line between wisdom and extrava-

gance. For the present alone perhaps it matters not; the world is busy and the ceaseless hum has tuned itself to one of universal harmony; it is only when the discord comes and the little waves do beat against themselves and throw the whole world out of tune that we shall need to stop and ponder well.

Don't we often wonder why the same economic policies which are carried out in our departments of production are not extended to our distributing bureaus? Is it easy to imagine where so many traveling salesmen come from, and gentlemen, if I have heard it once, I have heard it 1000 times in the last five years, "How do so many retail dealers exist?"

EXTRAVAGANT DISTRIBUTION.

It is in the distribution of our product more than anywhere else that there is room for improvement. The economic evolution which is everywhere so marked is hardly noticeable here; we are spending dollars where we used to spend cents, and even our percentages have increased. Is it then more than natural that in looking around for an anchor well to windward the wisest heads of our country and of the world should have decided to inaugurate these great consolidations, hoping thereby not only to eliminate evil tendencies, but to effect economies which would not otherwise be possible.

I am told, gentlemen, that in the city of Brooklyn, in a single block, wherein live 52 families, the total consumption of milk per day is 58 quarts, and it takes 42 milkmen to deliver it.

Now, if 20 men are doing to-day the work that could be accomplished by one, let us save it. If 20 tons of advertising matter are distributed and accomplish only the results which would be accomplished by 1 ton of advertising matter properly distributed, let us save that also; let us, while continuing our policy of aggression, steer clear of the shoals of extravagance.

PRESERVING COMMERCIAL EQUILIBRIUM.

The old theory that the introduction of labor saving methods and machinery would necessarily mean labor unemployed is a pure fallacy. There is not labor enough in this country to-day, and what would we do if it was not for the labor saving machinery, much of which has been installed during the past 25 years under more or less protest? Let us not allow ourselves to be blinded by the popular clamor and led to believe that mercantile consolidations are made entirely for evil; they are not; they are but the natural evolution of our old system of distribution and, though still in their infancy, I believe in their growth and development they will assume shapes and proportions not conceived of to-day, and though, because of the lack of wisdom on the part of those who dictate and direct their policy, they may meet with public disfavor on every hand, and if the surplus water which goes to make up their capitalization may have to evaporate or be drawn off, and if in individual and perhaps in common cases they may rise only to fall, it is my sincere belief that through them, by them, or because of them, we shall have so mastered the situation that a plan will be evolved whereby our commercial equilibrium can be preserved for a much longer period in the future than it has been in the past.

Right is might to-day, as much as it was a thousand years ago. A policy formulated and carried out on any other line by an individual, firm, corporation or consolidation is bound to totter and fall. An unfair, grasping, dictatorial policy may temporarily succeed, but its success cannot continue indefinitely; whether it works an injustice to an individual, to a community, to a State or to a nation, a way will be found by which the evil can be eliminated.

On the other hand, the economic value of a consolidation properly managed and which would be able to attain a degree of efficiency beyond the reach of the rank and file of destructive competition would work as a vast power for good, not only to itself, but to the user and the manufacturers as well.

THE UNIT OF ALL WEALTH IS LABOR.

The crude raw material is of little value until molded into shape. The tree in the forest and the ore in the mine are comparatively nothing except the labor units necessary to make them articles of commerce. The labor is always at hand; there was never a time in our most depressed period when the labor units could not be had. The problem which then confronts us, however, is the ability to turn them into cash. The distribution of our product based on these labor units is a serious problem, not perhaps at the present moment, when orders are plenty and goods are scarce, but a problem, nevertheless, which demands our attention, and however efficient our present system may be, it is plain to every one that there is still room for improvement.

THE MANIFEST EVILS

are not hard to find; destructive competition, unwarrantable production and the excessive multiplication of the avenues of distribution give grave cause for alarm, and there is no surer way to put a stop to these abuses than by a plan in which the unity of interests makes the welfare of the one so closely connected and allied to the welfare of all that temptations even of an evil nature shall be eliminated.

It is not to be expected that we can reach in the present decade the long looked for millennium, or that such a state of affairs will come to pass during the lifetime of the present generation; but the world and everything in it must move on and improve or deteriorate and decay; there is no stopping, there is no holding on in any particular position; it is either forward or backward; with the conditions of the present times, so vastly different from those which existed even a dozen years ago, we must not be content to rest until some policy shall be inaugurated whereby we may eliminate a portion, at least, of the evils which have worked themselves into our distributing policy and plan.

STRONG, HEALTHY COMPETITION.

The old time adage of the survival of the fittest must not be considered in a narrow light; those who destroy what they cannot obtain are not necessarily the best fitted to survive. Competition should not be wiped out; a strong healthy competition is the best possible commercial invigorator. On the other hand, a destructive competition not only injures those who are directly connected with it, but in an indirect manner it does grievous injury to our whole commercial fabric, and our old commercial system, the system which we have been following for the past 50 years, needs protection from this kind of a thing to-day as much as ever our infant industries needed the assistance of a protective tariff.

It is impossible to legislate against evils of this character; it is equally impossible to suggest, formulate or dictate the policy of any organization and be able to carry that policy into effect unless that organization is absolutely controlled. A combination without a consolidation is not in a position to do this work well. In this, as in a trust agreement, there is not a unity of interests. Over and over again have these things been tried. Way back in 1855 they formed a Shoe Peg Trust, one of the first, I believe, that was formed in this country. How long did it last? Perhaps a year. Why did it go to pieces? Simply because the interests were so scattered, and despite their agreement a feeling of distrust overcame everything else and different interests were continually knifing each other behind the scenes.

PERFECT UNITY OF INTERESTS.

It is only in absolute consolidation; with a perfect unity of interests than can formulate, adopt and carry into effect an economic conciliatory policy, combined with a high degree of efficiency; that we can fortify our mercantile interests as they ought to be fortified. To be sure these consolidations will control a vast power, but it stands within their province to use this power wisely and well; it not only stands within their province so to do, but it behooves them to do it, otherwise the purpose for which they were created will not be accomplished and the law of evolution will wipe them out.

It is not to be expected that these great consolidations will entirely drive out competition. It is not to be desired that such a thing should come to pass, but it is hoped that they will, in a measure, control the situation. We do not want to see the feature of competition completely eliminated; we do not want to have new industries throttled; we do not believe that our present commercial interests should be hampered in their growth, but a wise temperate policy will work the greatest good in the long run and the good will of the public can be

secured by returning to the people, so to speak, a portion of their tribute in the way of a reduced cost to the consumer because of the economy effected in the distribution of goods.

A consolidation of commercial interests is no monstrosity unless an unwise policy makes it so. They have a power, we will admit, but that power must be used for good or it will be taken away, and the guardians of our country holding forth in the nation's capital will see to it that laws are inaugurated which will prevent, in a great measure, the carrying into effect of any policy which shall not be fair to all concerned.

HARDWARE ORGANIZATIONS.

In this connection it is well to give due credit to those national and State organizations which have done so much for the Hardware trade of the United States during the years which they have existed. They have done more perhaps than any other one thing to eliminate bad feeling between competitors and stimulate good feeling between different branches of the trade.

What this has accomplished, not only for the dealers themselves, but for the manufacturer and consumer as well, is too plainly apparent to need mentioning. I believe the time has come when we can go a step further, and although that consolidation in which we have taken a vital interest has, for the present at least, been abandoned, I believe it is sure to come and that the great consolidations which have been made and which will be made in the future just as soon as they get their bearings and their machinery into action will be able to improve still further our conditions as a whole.

HARDWAREMEN.

The word Hardware has a warm place in our hearts; this particular branch of industry is perhaps nearer to us than any other; in its ranks will be found as grand a set of men as have ever lived, men who have been accustomed to fight the battle of life from their birth; men who have for many years kept their shoulders diligently to the wheel; men who have risen from the most menial positions to the highest; men who from knowing how to labor themselves appreciate to a full degree the cost and value of labor.

It is a business which must be thoroughly mastered and understood if it is to be handled successfully, and the Hardware trade are to be congratulated upon this fact: following up a mere whim, an individual firm or corporation cannot engage in the Hardware business and make a success of it; they must pay their tribute in labor before they can hope for reward; notwithstanding all this they have made their mistakes and without being personal, I believe it is no exaggeration when speaking as a class to say that until perhaps three years ago the Hardware jobbers of the United States never realized that the interests of the Hardware manufacturers were almost akin with their own.

There was too much tendency in many localities to break down the manufacturer's prices and ignore his goods; some of our good friends were driven to the retail trade and some of them were driven out of business, and for quite a considerable period the markets were flooded with no end of cheap trash, for which this mistake was directly responsible.

THERE HAS BEEN AN AWAKENING,

and the National Hardware Jobbers' Association and the Southern Hardware Jobbers' Association and all the Hardware associations of this country in a great measure deserve the credit for it; because of their organizations they have been able to curb the radical and help the weak; they have been able to bring about a realization of the fact that the jobber's success depends upon the manufacturer's good will to just as great a degree as does the manufacturer's success depend upon the jobber's good will. Their interests are so interwoven that neither can prosper without the other, and if good feeling exists between them the better for all concerned.

I am alluding to this matter simply because I believe it has a bearing on the consolidation theory and tends to strengthen that theory in so far as proves that even association is beneficial. I do not expect that the older ones of this assembly will fully agree with me; I think I see some misgivings, a few doubts and perhaps a very little disgust written on the faces in this audience; they are probably thinking that we did not have these things 50 years ago; they were not a necessity then and they are not a necessity now, and I am reminded of a story of a negro parson who having been given light upon a certain knotty problem hastened to spread it among his parishioners. It is an old story; possibly you all remember it. He commenced his Sunday evening discourse as follows:

"Brederin and sisters, brederin and sisters, dare's one thing in de Bible dat's been boderin' me for a long time. How de children of Israel went tru de Red Sea and Pharo's army was swallowed up and drowned, and brederin and sisters, I never cud understand how dat was, and now I understand jest how dat was, it cum to me just as plain. It was de last end of the winter and de ice was on de Red Sea and de children of Israel went over on de ice and de weder was warm and de ice got weak and Pharo's army broked thru and was drowned, and I was very thankful, brederin and sisters, to be able to explain dat to you."

He then proceeded with his discourse until the meeting finally became one of general discussion, whereupon a young boy in the audience spoke up and said: "Parson, I'd like to ax ye a question." Without looking at him the reverend gentleman said: "Let the young man ask his question." "Parson, it say in my gography that de Red Sea am near de equator and dey don't never had no ice an' snow dare, and' I'd like to know how you explain dat."

After adjusting his spectacles the parson turned to the audience, "Hear de young man, hear de young man; why, de very idee uv de young man comin' here and tryin' to tell us about de Bible, when we've studied de Bible befo' he was born; why, brederin and sisters, de very idee uv dis young man comin' here and tryin' to tell us about de Bible, but I can explain dat to de satisfaction of de young man. Dey didn't have no gography in dem days."

CONSOLIDATIONS A BLESSING IN DISGUISE.

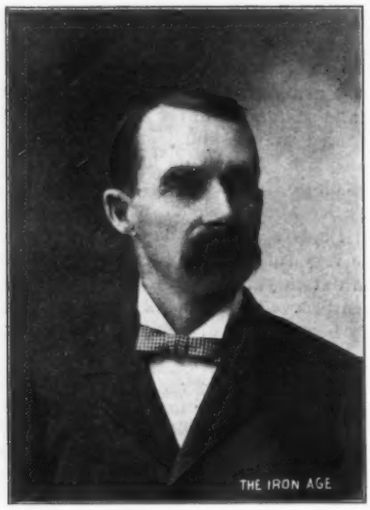
Gentlemen, these consolidations did not exist in the old days; they were not needed then; there are a good many things which they did not have 50 years ago which we are enjoying to-day, and some of them were looked at considerably askance when they first appeared, but these freaks, so to speak, in their development have turned out to be blessings in disguise that have brought wealth to our nation and comfort to our people.

Now the mercantile consolidations of to-day are mere fledglings, though they belong to the large species; they have a mission to fulfill, and I believe they will fulfill it; difficulties, not facilities, make men and make nations; certainly the paths which our consolidations will have to travel at the outset will have few roses and many thorns. It will be necessary to learn how to control and govern them and then find able men who are capable of doing it, but I believe they will play a large and important part in the future commercial history, and though the mistakes of those who are responsible for their creation will in a measure retard their growth and development, their over capitalization is but an incident, and though of grave moment, an incident nevertheless, and a setback for this and other causes is to be expected and looked for, still I believe they will be in a better condition to cope with the conditions which confront us now and which will confront us in the future than individual and scattered interests.

It is not necessary, however, while adhering to this opinion that we should get onto the band wagon or get out of the road. The flag of freedom which floats over our country grants us the privilege of pursuing the even tenor of our ways. Mercantile consolidations, however, are not to be scoffed at, and while it is not necessary that we affiliate ourselves with them, let us not be vain enough to think that we shall grow rich over their downfall; while not overestimating let us be equally careful not to underestimate, but by keeping in close touch with the situation be able to conserve and guard our interests in the future, as we have in the past, and when these interests can be conserved, protected and furthered by a policy of consolidation, I believe the Hardware manufacturers of the United States will not be slow to adopt it.

NEBRASKA RETAIL HARDWARE DEALERS' ASSOCIATION.

IN our last issue we announced the organization of a new State association in Nebraska at a meeting held in Hastings on the 3d inst. There was a fine at-



C. K. LAWSON, Hastings, First Vice-President.

tendance of merchants and the association was inaugurated under very satisfactory auspices. Those in attendance represented 51 firms, while more than 25 letters were read from other parties expressing their interest in the movement.

Herewith we give portraits of the officers elected for the first year, with the exception of C. W. Morton of Jas. Morton & Sons Company, Omaha, who at first declined to accept the office on account of the exacting demands of his own business. Mr. Morton has, however, reconsidered the matter, and we are in receipt of a telegram from him to-day in which he announces that he has accepted the office. In connection with the portraits of officers we also take pleasure in giving a por-

W. T. COLEMAN, McCook, Second Vice-President.

trait of Alexander F. Meyer, to whom much of the credit for organizing the association is due. Mr. Meyer is a member of the Executive Committee.

It seems quite likely that the new association will have a summer meeting, probably during the second week of August.

THE TUCKER TOOL & MACHINE COMPANY were recently incorporated and are carrying on a business in factory and mill supplies at 135 Greenwich street, New York. The officers are M. E. Stone, president and treasurer,

J. CASS CORNELL, Ord, Third Vice-President.

and C. H. Tucker, Jr., general manager. This is a continuation of the business carried on by C. H. Tucker,

HARRY J. HALL, Lincoln, Secretary-Treasurer.

Jr., since 1885. The company will continue to act as agents for the Wiley & Russell Mfg. Company, Weld-

ALEXANDER F. MEYER, Hastings, Executive Committee.

ing Compound Company, Anderson Pipe Cutter Company, the Crosby Hack Saws and other leading lines.

EXPORT CLUB OF AMERICA.

THE EXPORT CLUB OF AMERICA is the name of a new business and social organization which has just taken possession of quarters on the ground floor of the Tontine Building, corner of Wall and Water streets, which is conveniently located within a short distance of most of the principal export houses down town. The rooms have been properly furnished with modern conveniences, including files for catalogues, price-lists and other interesting matter pertaining to American manufactures. The club has been incorporated with a capital of $5000 and its officers are as follows:

EXECUTIVE BOARD.

Hugh G. Millar, president (president National Skylight & Construction Company).
William F. Struller, secretary (formerly buyer, Struller, Meyer & Julia).
Arthur E. Hernandez, treasurer (buyer, Sussdorff, Zaldo & Co.).

ADVISORY BOARD.

Oscar Huttlinger, first vice-president (Consul of Santo Domingo).
Juan J. Ulloa G., vice-president (Consul General of Costa Rica).
Ernesto Schernikow, vice-president (Consul of Salvador).
Gerardo Zalles, vice-president (Consul General of Bolivia).
Dr. Joaquin Yela, vice-president (Consul General of Guatemala).
N. Bolet Peraza, vice-president (Consul General of Honduras).
E. Gonzalez Esteves, vice-president (Consul General of Venezuela).
Felipe Madrigal, vice-president (Consulate of Costa Rica).
A. F. Xaviar, vice-president (Consul of Brazil).
N. Bolet Monagas, vice-president (Secretary of Honduras Consulate).
William Mitchell, vice-president (buyer, Sussdorff, Zaldo & Co.).
Otto E. Glocke, vice-president (banking department G. Amsinck & Co.).
Fred. W. Struller, vice-president (North German Lloyd S. S. Company).
Chas. E. Armstrong, vice-president (manufacturers' agent).
Edward Meyer, vice-president (buyer, Samper & Co.).
Harman S. Salt, vice-president (Western Electric Company).
Victor Maiga, vice-president (of Victor Maiga & Co.).
William Reimers, vice-president (president Empire Ribbon & Machine Company).
Chas. E. Meyer, vice-president (buyer, Huttlinger & Vivié).
W. A. Davidson, vice-president (export lumber).
J. Callahan, vice-president (buyer, A. Guimaraes).
A. Heun, vice-president (buyer, D. A. De Lima & Co.).
Geo. Donahue, vice-president (buyer, A. M. Seixas).
A. W. Kurz, vice-president (Permanent Mfg. Company).

In this connection may be mentioned the following, who are officially identified with the club, viz.: Attorney, William T. Read, Lords Court; consulting engineers, Robert Schalkenbach, C.E. (manager Eastern Construction Company), for construction and structural work; Manuel M. Llera (export department James Beggs & Co.), for machinery and Spanish-American technique. The club's banking interests will be cared for by the Empire State Bank of New York.

The Membership.

Among the charter members, the number of which is limited to 500, the actual membership now being 417, are found individuals connected with the following manufacturers, a number of whom, it will be seen, are identified with Hardware, iron and related lines:

New York Leather Belting Co.
Eagle Pencil Co.
R. E. Dietz Co.
Herrmann Furniture Co.
Longman & Martinez.
Abendroth & Root Mfg. Co.
F. W. Devoe & C. T. Raynolds Co.
James S. Barron & Co.
Milliken Bros.
Arthur Koppel.
Mosler Safe Co.
The W. L. Gilbert Clock Co.
Fairbanks, Morse & Co.
American Lead Pencil Co.
J. A. Roebling's Sons Co.
American Axe & Tool Co.
James Beggs & Co.
Empire Laundry Machine Co.
Permanent Mfg. Co.
Thornton N. Motley Co.
National Biscuit Co.
Electric Storage Battery Co.
A. Leschen & Sons Rope Co.
Gill Brothers Co.
Enterprise Mfg. Co.
American Spiral Pipe Works.
Minot, Hooper & Co.
Kuhne-Libby Co.
American Iron & Steel Mfg. Co.
Oil Well Supply Co.
Chas. F. Mattlage & Sons.
Globe-Wernicke Co.
Yale & Towne Mfg. Co.
Deming Co.

The memberships of this club are individual, although they may represent the firm with which they are identified. In addition to the members belonging to manufacturing concerns, there are in the club many buyers connected with some of the leading export houses of New York.

The club was organized in January of this year, but its incorporation was only effected recently, preparatory to the occupation of the new quarters.

The dues of the club are $10 per year, initiation fee $25. The charter membership of 500 is exempt from the payment of the initiation fee, which limit when reached will end this advantage in joining now offered.

The Plans of the Club.

The club has been formed for the purpose of promoting commercial relations between the American manufacturer, the foreign buyer and the export commission houses of New York. The individual buyers of these concerns have neither the time nor the inclination to make special effort to introduce and sell the products of manufacturers, or to distribute manufacturers' catalogues and other trade literature among foreign customers. The views in this respect as entertained by some of the officials of the club are outlined in what follows:

Any communication emanating from an export house to their customers may be construed as biased advice. It also puts on the exporter, in a measure, the responsibility for the good or other outcome of the goods shipped. If the buyer abroad indicates to the commission house in New York the name of the manufacturer and the brand or other specification of the goods desired, it releases the exporter from any implied responsibility as to quality and usefulness of the article ordered.

This association assumes the duty of pointing out to the foreigner those manufacturers in this country who are best qualified to furnish goods for export, who cater best to the interests of their customers, and who, from the habit of shipping to foreign countries, have acquired the often intricate facilities for the execution of orders and the manner in which export orders should be filled.

It is the aim of the club to invite the confidence of foreign buyers who now have no intermediary in their purchases, and whom they will be justified in regarding as unbiased. For instance, a foreign buyer desiring to purchase a certain quantity of machinery or other material addresses the club and explains his wants, indicating the amount of money at his disposal for the purpose in question, when the secretary of the club will notify all the American manufacturers, members of it and dealing in such articles as are likely to be used by the buyer for his particular purpose. It is expected that the foreign buyers will in time realize that by this method they will get such catalogues as represent a variety of goods to choose from, and when the membership of the club has reached a certain number, embracing many of the manufacturers with goods to export, considerable expense and trouble will be saved the buyer for foreign trade, and the manufacturer will have an opportunity of being presented to possible buyers and reaching his customers direct.

The following supposititious case, based on experience and facts, will make this plain. The buyer in South America requiring manufactured goods writes to some export house in New York with whom he is acquainted, stating his wants and asking for prices to cover the installation proposed. The export house get one or two quotations from among those nearest to them and quote the lowest to the customer. This means that a great many houses, also manufacturers of similar articles, have never had an opportunity of reaching that merchant. One of the remedies for this has been the sending out of travelers, appointing local agents and doing a direct business. The criticism of this from the club standpoint is that it is an expensive method. It compels the buyer to advance funds for payment against bill of lading in the hands of the bank here or abroad. It necessitates a large outlay and expense to maintain an export department in the manufacturer's office in order to be properly able to fill the requirements of foreign custom houses, steamship companies and other requisites peculiar to the export business. There is also the commission of the foreign agent, which in any case is equal to, if it does not exceed, the profit usually made by the export commission merchant.

It is pointed out that the manufacturers would not mind this expense, and would consider this the proper method were it not for the fact that it is antagonistic to the New York export commission merchants; as they are undoubtedly a power and their business is fully equal to, if not greater than, the business obtained by direct efforts, there is a constant clash between the export merchant and the manufacturer. The purpose of this club is to minimize or do away with this feature.

It is the purpose of the club to act as an Export Board of Trade or Exchange. Committees are being appointed as fast as the membership warrants in the various trades, among which are Machinery, Engineering, Hard-

ware, Oils, Paints, Drugs, Crockery, Furniture, Provisions, Electrical and others, each committee consisting of representatives of the leading houses doing export trade. These committees also serve as arbitrators for cases in dispute relating to export. There are also a number of trade features which are in contemplation, which have as yet not taken definite form. It is also in mind to secure the services of several competent salesmen to travel constantly in the interest of the members of the Export Club, especially in South America, Mexico, Central America and the West Indies. The visits of these travelers will be something of a novelty to foreign buyers in those sections, as their object is not to take orders but to ascertain the wants of buyers and call the attention of the trade to the goods produced by the manufacturers identified with the club. Members will likewise be advised where and how to send catalogues, price-lists and trade literature direct to the foreigner.

The social end of the club will be carefully looked after, with a view to promoting trade interests and enabling interested parties to make each other's acquaintance. It is proposed to give a series of reunions at the club rooms on dates which commemorate the independence of the various South American countries. This series of receptions will begin on July 5 with the celebration of Venezuelan independence occurring on that date. For this purpose a committee of well-known Venezuelans has been appointed who have charge of the celebration. It will be the first reception held in the rooms of the club, and will be followed by others of similar character on commemoratory dates.

Manufacturers are cordially invited to send copies of their catalogues and trade literature to the Export Club for incorporation in the club library now forming for the use of its members.

CONJECTURES ABOUT JOBBING CONSOLIDATION.

WHILE the project of the jobbers' consolidation has been overtaken by disaster and is in good measure treated as a thing of the past, the subject has not entirely vanished from the thought of the trade, as illustrated in the following communication from a Southern merchant, who writes, apparently, with a general sympathy with the consolidation movement:

In these days of consolidations it has seemed strange to many that the much heralded Hardware combination has failed to materialize.

Greatly at variance are the opinions as to just why it failed of consummation, but that it did fail being a settled fact, the interesting question is whether or not it would have proved a success if the consolidation had been effected as proposed. It would have been an object lesson that would have been closely studied not only by the Hardware, but by every other trade as well. The standing and character, the acknowledged ability of the proposed officers and directors were such that failure would have permanently settled the question as not being feasible, while success would have made of it a shining example for others to follow.

There is no doubt that, say, four large houses seeking the trade of a certain section, amounting to just so much and no more, are multiplying by very nearly four the expense necessary to secure that trade, and at the same time, through keen competition, holding the profits down to the barest living margin. With one management and not much more than one expense, the same amount of business could be done, the same amount of profit made, without the necessity of advancing a single price. Wise management would fight against advancing prices, for the success of the company would depend on their protecting the interests of their customers and the consumer.

The retail merchants would have more confidence in their purchases. As to their sales, there's the rub. To protect themselves, to make the system perfect and truly a success, they would have to form similar local combinations to reduce expenses and to preserve a living percentage of profit.

Follow the system through, and the consumer need not suffer one penny's worth if the right spirit prevailed. The manufacturer need not suffer, provided his margin of profit be not greater than it should be. The powerful manufacturer could preserve his independence because of his strength—the small one could surely be able to find enough customers outside the ranks of the consolidated houses to place his product at his usual profit. The only sufferers would be the comparatively few employees who, made surplus help, by the new system would be thrown out of employment, but history proves that the individual invariably takes care of himself, and no house ever hesitates about adopting a labor saving system or device out of consideration for a clerk or two.

Theoretically the combination, properly capitalized and managed, would have been a success without justly incurring the ill will of the public. If only for the sake of deciding its utility it is a matter of regret that it could not be tried. It is the birth of an idea that could certainly be carried out advantageously on a smaller scale by houses in the same city.

TRADE ITEMS.

AT the recent annual meeting of the General Manifold Company, Charles B. Holdrege was elected a member of the Board of Directors. Mr. Holdrege is the general manager of the above company, who have their general offices and plant at Franklin, Pa., with branch offices and agencies in a number of the principal cities. He was for several years manager of the Railway Supply Department of Hibbard, Spencer, Bartlett & Co. of Chicago.

RICHARD ELLIOTT, formerly assistant secretary of the Atwater Mfg. Company, is now general manager of the Acme Mfg. Company, Plantsville, Conn., manufacturers of a large line of Screw Drivers.

AMONG the names of those recently granted a diploma by the University of the State of New York for the degree of C. P. A. (Certified Public Accountant) is that of A. T. Spratlin, who for the last 12 years has been employed by the Sickels & Nutting Company, 35 Barclay street, and their predecessors, wholesale dealers in Hardware and manufacturing agents.

BLEECKER BANGS, who for ten years has been identified with the Thornton N. Motley Company, is now devoting his time solely to the interests of E. J. Hussey & Co., 80 John street, New York, with whom he has long been financially connected. This concern make Hardware Specialties and Supplies, among which are Bicycle Step Ladders, Griggs' Telephone Holder, &c. They also deal in Factory, Mill, Railroad and Contractors' Supplies.

THE CINCINNATI FALL FESTIVAL, "for the honor and glory of Cincinnati," will be held September 15-27. The gathering will be conducted under the auspices of the Fall Association of Cincinnati.

THE HOOPESTON HORSESHOE NAIL COMPANY, Danville, Ill., expect to have their factory in operation by July 1. Most of the machinery is already in hand, and will be placed in position as rapidly as possible.

THE NATIONAL PROJECTILE WORKS, Grand Rapids, Mich., have taken a unique way to advertise the merits of the Lubricated Wire Patched Bullets which they manufacture, copies of testimonials and original letters from men of prominence being sent to those they would interest. For these Bullets the following claims are made: The Bullets take the rifling of the gun more nearly perfect, receiving more pressure of the powder gas and producing a higher velocity; the cotton covered soft metal diminishes the wear upon the grooves of the rifling; the lubricated patching cleans the bore and reduces the heating of the barrel in rapid firing.

THE WORTHINGTON MFG. COMPANY, Elyria, Ohio, have purchased the interests of the Fay Tricycle & Invalid Chair Company and the Golf Goods department of the Automobile & Cycle Parts Company, and in the future the factories will be combined in one, at Elyria, and some other lines added to run the plant to its utmost capacity. For the present, however, the two factories will be run separately, as they have been in the past, but under the new management.

NOTES ON FOREIGN TRADE.

BRITISH LETTER.

Office of *The Iron Age*, Hastings House, Norfolk St., London, W. C.

The Week's Hardware Market.

THE settlement of peace in South Africa, so far as it affects the South African trade, I will refer to later. It may be said generally that while bringing no boom with it, it has at least induced some buoyancy of feeling by putting a limit to the heavy financial drain which has been acutely felt for some time past. With the exception of one or two special lines, prices have not altered, and there is no visible improvement or any immediate prospect of any improvement in the home trade. The better weather we have recently experienced, although by no means clement, has none the less led to some improvement in the building trade, and in consequence Builders' Ironmongery is going off slightly better. In these lines much leeway must be made up, however. A distinct improvement is reported in the brass trades, which at the present time are becoming busy in anticipation of the autumn demand for Chandeliers, Gas Fittings, Lamps, &c. American manufacturers who are looking to do some trade in this country in the autumn should at once take counsel with their British representatives with a view to arranging patterns and designs. The retailers buy these goods at least three months in advance. As I have more than once remarked, the Edged Tool trade is doing well, not only for home demand, but also on account of the East and West Indies, South America and South Africa. Wire work is in good demand, particularly for cages, horticulture, springs and wire mattresses. The Hollow Ware trade, both in wrought and stamped work, is doing much better, and the tin plate workers are busy on Trays, Teapots, Lanterns, &c. The makers of Enameled Sign Plates still continue unable to supply their orders, and the seasonable japanned goods are in request. Railway material, both light and heavy, is wanted in heavy lots, and preparations are being made to supply South Africa. On the export account, Canadian orders are plentiful, particularly, for the supply of mining, agricultural and fishing industries of the Dominion. Trade with the Australian commonwealth continues unsettled and spasmodic, doubtless due to the prolonged and serious drought which has caused the loss of millions of sheep in Queensland and New South Wales, and consequently restricting the wool crop. The settlement of the dispute between Chile and Argentina has led to a better tone and increased demand, a remark which also applies to other States in South America, with the exception of Brazil. Brazilian trade is much below the average. There is a steady foreign demand for Copper Sheets, Tubes and Wire, but competition is very keen and exporters are making no profits. The unprofitable nature of foreign competition in these lines is reflected in the unsatisfactory result of last year's trading of the Midland metal companies. The war settlement appears to have had a steadying influence upon the Tin Plate trade in South Wales. The wage agreement in the Tin Plate trade comes to an end on June 30. It seemed for some time that there would be serious trouble in arriving at a new agreement. The most serious difficulties have now been surmounted. The chief of these is met by the masters conceding that from July payment shall be made by area instead of by weight. A big trade with South Africa is expected in Tin Plates and Galvanized Sheets for roofing, and orders have already reached South Wales in both these lines. In Sheffield there is little improvement to be reported in the lighter industries. Some firms are doing a fair amount of business in Cutlery and Plate for the large London houses, but trade must be described as distinctly dull, with no immediate signs of improvement. The plating and Britannia metal trades are doing practically nothing. The effect of the strike in the white metal trade has been to enable manufacturers to get rid of their large stocks which had previously been accumulated. There seems every probability that in this line the end of the strike will result in the discomfiture of the men, and many firms have announced their intention for the future of working with nonunionists. As touching upon the Cutlery and allied trades, I would draw particular attention to a report issued by the American Consul at Solingen. Until the middle of last year celluloid in plates, whether white or colored, was subject on importation to a duty of 3 marks per 100 kg. The custom houses were at that time instructed that Black or Tortoise Shell Plates without preparatory work were to be classed as polished and subjected to a duty of 200 marks per 100 kg. Celluloid of German make is used to a great extent in Germany in the manufacture of ordinary Cutlery, but for the better class of Knives imported material must be used, tests of German celluloid having shown that it is not yet sufficiently free from acid. Thus as things are now the Cutlery industry of Solingen cannot do without celluloid, but the duty has recently prevented its importation. The local Chamber of Commerce appealed to the Government, with the result that a notification has been received that celluloid plates and sheets cut from a soft block, then dried and pressed for the purpose of removing an unevenness, shall be considered as "raw," providing the cutting grooves, whether on one or both sides, are discernible. A considerable quantity of celluloid is exported from England to Solingen, and in some instances has now actually to be artificially roughed in order to pass the German customs as raw or unfinished goods.

The South African Trade.

Now that the war is over all eyes are turned to trade prospects in South Africa. To a considerable extent peace conditions were anticipated by the market, with the result that upon the announcement of peace prices fluctuated very little. Galvanized Iron Sheets advanced 2 shillings 6 pence per ton, making the new quotation £12 2s. 6d. Plain Black Sheets also rose 2 shillings 6 pence, doubles becoming £8 2s. 6d. There was some little feverish buying and selling in this particular line of goods, but on the whole the merchants concerned had all made their arrangements beforehand. As showing the trend of the trade to South Africa, I subjoin a list of Hardware and allied goods shipped to South Africa from the port of London last week:

London Exports to South Africa.

CAPE TOWN.
8 cwt. Brass mfrs.
39 doz. Brushes.
$420, Caoutchous mfrs.
$350, Carriages.
$240, Cutlery.
$2360, Cycles.
$165, Electrical Materials.
$2315, Furniture.
19 cwt. Hardware.
$100, Implements.
$200, Instruments.
1 ton Iron Wire.
2 tons Galvanized Iron Sheets.
1 ton Iron Nails.
14 tons Iron mfrs.
41 cwt. Steel Fire Proof Curtain.
$875 Machinery (not steam).

EAST LONDON.
27 cwt. Brass mfrs.
238 doz. Brushes.
12 cwt. Copper mfrs.
$260, Cutlery.
$150, Cycles.
$2205, Electrical Materials.
$1490, Furniture.
213 cwt. Hardware.
$170, Implements.
$180, Instruments.
28 tons Galv. Iron Sheets.
4 tons Iron Anchors and Chains.
1 ton Iron Screws.
15 tons Iron mfrs.
$4125, Steam Engines.
$10,185, Steam Mining Machinery.
$555, Agricultural Machinery (not steam).
$13,305 Machinery (not steam).
$550, Metals.

DELAGOA BAY.
51 tons Galv. Iron Sheets.
$2135, Machinery (not steam).

DURBAN.
30 cwt. Brass mfrs.
191 doz. Brushes.
$3750, Carriages.
$520, Caoutchouc mfrs.
$165, Cutlery.
$790, Cycles.
$3545, Electrical Materials.
$4860, Furniture.
161 cwt. Hardware.
$3975, Implements.
$1585, Instruments.
33 tons Galv. Iron Sheets.
1 ton Iron Anchors and Chains.
14 tons Iron mfrs.
4 tons Sheet Lead.
2 tons Lead Pipe.
$2750, Steam Engines.
$7910, Machinery (not steam).
$1735, Metals.
$1075, Plated Ware.

PORT ELIZABETH.
$85, Safety Cartridges.
$150, Lead Shot.
23 cwt. Brass mfrs.
$900, Cartridges.
$1050, Caoutchouc mfrs.
$350, Cycles.
$1625, Electrical Materials.
$2400, Furniture.
101 cwt. Hardware.
$200, Instruments.
$615, Implements.
31 tons Galv. Iron Sheets.
28 tons Iron Tubes.
11 tons Iron mfrs.
6 tons Steel mfrs.
$1160, Steam Engines.
$35,670, Steam Mining Machinery.
27 tons Manganese Ore.
$215, Machinery (not steam).

The goods herein mentioned are representative so far as material is concerned, but, of course, it is necessary to remember that large quantities of similar kinds of goods have been shipped from other ports. I confess I do not myself anticipate much market excitement in South Africa for some little time to come. There

must needs be, of course, activity in supplying absolute necessities. Bridges will have to be built, calling for prompt supply of railway material, inland stocks must be replenished, and cheap builders' Ironmongery will necessarily be in great request, but the stocks in the coast towns are exceedingly heavy, and supplies will be pushed up country without delay. The money advanced by the British Government to the burghers in the Transvaal and the Orange River Colony will not reach the pockets of the traders for some months to come. Inquiries will have to be made by British officials, and this will take time. In addition to the grant of £3,000,000, money is to be loaned by the Government for two years without interest, and after that at 3 per cent. This will doubtless ease the situation to some extent, but the borrowers are unlikely to burden themselves with more debt than they can help, and it is a practical certainty that there will be no superfluous cash in South Africa probably for some years to come. In addition, it must be remembered that the cost of living must be abnormally high. Take, for example, the Colony of Natal, which, after all, has not been subjected to the ravages of war to nearly the extent of Cape Colony. A gentleman writing upon the cost of living in Natal says:

I can indicate to some extent how the cost of living in Natal is affected by the tariff; and that is the feature of most interest to prospective settlers, and to others who may wish to gauge the suitability of Natal's conditions for industrial enterprise under existing circumstances. Last year the Collector of Customs issued an instructive return showing the proportion which the duties levied under the present tariff upon foodstuffs, &c., bore to their invoice cost. A quotation here of some of the most important items from that list should show fairly well how the incidence of the present tariff falls. Certainly the poorer the man the heavier it falls. The figures given below are those showing a percentage of duty in 1900 upon the invoice cost of the articles named, and it must be borne in mind that the different middlemen add their interest upon a liberal scale to the duty paid, which interest, together with the limitations of a currency, means that a penny is added where the duty may only mean a sixteenth of a penny, as halfpennies are almost unknown in Natal. Hence the actual percentage, due directly and indirectly to the duty, which the consumer pays, may be in some cases greatly in excess of the percentages shown here: Chicory, 122.4 per cent.; bacon and hams, 32.7; butter and margarine, 28.5; cheese, 46.1; ordinary confectionery, 28.1; maize, 61.5; maize meal, 36.3; coffee, 21.4; condensed milk, 12.5; dried fish, 40; dried fruits, 47.6; preserved fruits, 60; jams, 56.2; lard, 42.1; preserved meats, 31.6; pickles and sauces, 35.3; preserved vegetables, 61.5; onions, 100; common salt, 25; spices, 42.1; refined sugar, 33.3; golden syrup, 21; unrefined sugar, 23.1; tea, 81.3; bottled vinegar, 66.3; vinegar in wood, 63.1; concentrated soup, 20; oilmen's stores, 7.5; ale and beer in bottles, 50.2; ale and beer in wood, 100; brandy, 114.6; gin, 480; rum, 183.7; whisky, 183.7; spirits of wine, 222.2; wines in bottles, 50.8; wines in wood, 155.5; tobacco unmanufactured and unstemmed, 250; manufactured and cut, 254.5; cigars, 90.2; cigarettes, 97.9; candles, 48.8; matches, 120; paraffin, 38.4; soap, 28.5.

I would direct the attention of American exporters to a report which has just been issued, signed by James Cumming, who has just returned to Canada after a tour of examination in South Africa as Special Canadian Trade Commissioner. Referring to agricultural prospects, he says that South Africa is not adapted for general agricultural purposes; the rainfall in most sections is deficient and irregular, and irrigation difficult. In portions of Cape Colony apples, pears, grapes, oranges, wheat, mealies and vegetables are produced of an excellent quality, and along the cost of Natal and Zululand tea, sugar, pineapples and other tropical fruits. The inland portions of Cape Colony and Natal being of a higher altitude and not so well watered, horses, cattle, sheep, ostriches, goats and mealies are the main products of the land. The Orange River Colony and the Transvaal are capable of much agricultural development, but until the labor supply is enlarged and improved, the mines will absorb most of the available native workers, and as Europeans cannot do heavy farm work, it will be cheaper to import food supplies. Taking a broad view, Mr. Cumming does not think highly of South African agricultural prospects. It necessarily follows that South African trade must be sustained by other industries, and consequently it would appear that we must look to diamonds and gold. One of the first things to be demanded will be furniture. Bedroom furniture is largely English in its style. Wardrobe doors should invariably have mirrors. Office desks, church and school furniture are now being sold of Canadian make, and are popular. Canadian bent wood chairs are also being largely sold. Farming implements will be supplied by Great Britain, Germany and the United States. It should be remembered that the motive power is principally oxen, and the farm hands are mostly raw natives or East Indians. The ground is often baked hard, owing to irregular rains, the land is rough and hilly, so that in consequence the implements required must be strong, easily controlled and simply constructed. Windmills are bound to be in good demand. The Natal and Cape Governments are assisting farmers in boring for water, so that windmills and pumping machinery may be looked upon as certain to secure a steady sale. The United States at the present time is leading in both these lines of goods.

The Transvaal the Predominant Partner.

From all I have heard I should say that in the future the Transvaal is likely to be the predominant partner in the South African federation of British colonies. There is no shadow of doubt as to its present enormous gold wealth, while its railway service penetrates both Natal and the Cape Colony. It is therefore essential for Americans who desire to put their South African business upon a firm basis to lose no time in establishing strong trade connections in Johannesburg. On this point I would quote from an interesting report in which figures are given clearly demonstrating this conclusion:

The predominant partner in any future union will be the Transvaal. Upon their trade with the Transvaal will depend the prosperity of the coast colonies. The trade between Natal and Cape Colony is trifling, if compared with that which the Transvaal can promise Natal. This will be obvious from a comparison of last year's trade returns. Thus, the value of Natal produce exported by sea to Cape Colony amounted to only £312,702, and the value of noncolonial produce to £176,957. Natal sent overland to Griqualand East goods worth £89,646, to Pondoland £16,336, and to Basutoland £2060, making Natal's total export trade to Cape Colony worth £597,701. Natal imported by sea Cape Colony produce to the value of £56,065, and of noncolonial goods from the Cape to £187,874, and from Griqualand East £127,293, Pondoland £11,616, and Basutoland *nil*, making Natal's total imports from the Cape Colony £382,848. Adding the total value of these exports and imports together shows that the sum total of the trade between Natal and Cape Colony in 1901 was £980,549. Coming now to Natal's trade with the Transvaal, I find from the returns of the Collector of Customs (Natal) that Natal exported to the Transvaal Natal produce, £155,678, and noncolonial produce, £2,327,134, making the total of her export trade to the Transvaal £2,482,812. Natal's imports from the Transvaal amounted to £66,085, exclusive of gold, but including gold-slag valued at £1580, and including wool to the value of £38,842. Adding the above exports and imports together, the trade between Natal and the Transvaal in 1901 is seen to have amounted to £2,548,897, and that, too, in spite of the war raging all over the former colony, and in spite of the fact that Natal produce is subject to duty in the Transvaal, whereas Natal produce enters Cape Colony free of duty. Moreover, upon all noncolonial produce imported into the Transvaal through the Coast Colonies the latter exact a "transit due" of 3 per cent. ad valorem.

The Trade of Beira.

The establishment of peace in British territory in South Africa will, of course, have an excellent effect upon other contiguous territories. Not the least of these will be the district of Beira, which is in many respects an excellent port. A very large proportion of the Beira and Rhodesian trade has been diverted from British to German lines of vessels. As a matter of fact, there is at the present time no regular British steamship service at Beira. This is partly accounted for by the fact that the annual subsidy given by the German Government to the Deutsche Ost Afrika Linie has been raised from $225,000 to $335,000. The British lines that formerly went to Beira received no subsidy. The following list of business firms in Beira may prove useful to American exporters:

GENERAL MERCHANTS.

Suter & Co., Limited, British.
Manica Trading Corporation, Limited, British.
J. D. Martini, British.
Wallerstein, Hirst & Co., British.
William Phillipi & Co., German.
Fabre et Fils, French.
Sud-Est Africain, French.
Companhia Agricola do Moribane, Portuguese.
Damodar Anangy, British Indian.

Tayoob Sakoor, British Indian.
FORWARDING AND COMMISSION AGENTS.
D. Cameron, British.
Glenny & Co., British.
Kidd, Schoch & Co., British.
Rapozo Bros., Portuguese.
LANDING COMPANY.
Beira Boating Company, British.

Trade in Poland and Lithuania.

There are a good many misconceptions as to the prospects of trade in the territory of Poland. Unless otherwise informed the average man thinks of Poland as being a more or less desolated, sterile country, with the one large town of Warsaw. Warsaw has a population of 750,000 people, but there are also a number of other large cities. There is Lodz, with a population of 500,000; Vilno, 160,000; Minsk, 100,000; Kovno, 75,000; Lublin, 50,000, besides several other cities, with a population ranging from 25,000 to 50,000. All these towns naturally have shops to supply the needs of the population. Altogether, the population of Poland amounts to 17,000,000. The trade is almost entirely in the hands of the Germans. The reason for this is that hitherto nobody, except the Germans, would give the necessary credit. Two essential points must always be remembered in trading with Poland. First and foremost, credit, and secondly, goods suited to the local demand, particularly in the matter of price. Financially the city of Warsaw practically depends on Berlin, and this, of course, plays enormously into the hands of German traders. It may be said without exaggeration that it is the usual thing in Warsaw for all business transactions to be upon a basis of six months' credit. As British exporters will only give one month, it is not surprising that the Germans have things very much their own way. The buying capacity of the Polish people is limited, and they cannot afford a first-class article. What with import duties, high price of money and other considerations, by the time the article reaches the consumer its price has been enormously enhanced. Thus a lot of marmalade, which in England costs 10 cents, costs 60 cents in Poland. A packet of "bromo" paper, costing 22 cents in England, is 60 cents in Poland. A prominent British resident of long standing and large commercial experience, writing upon the difficulties which Great Britain has to surmount to obtain trade in Poland, makes some comments which I think apply with equal force to American exporters. He says:

British firms are, as a rule, very badly represented, either by German or Jewish agents who, when they have formed a connection among manufacturers, try to transfer them to some foreign firm who offer more favorable conditions. British firms would do well to employ good travelers who know one of the languages current here, either Russian or German, and who would quote the prices in Russian currency and Russian weights, and also the exact price the given article will cost delivered in the works. Should the Russian and German Governments not be able to come to an agreement with the new treaty of commerce, there would be the prospect of a tariff war which would very much injure the export of German manufacturers to Russia. British manufacturers would then have a good chance of getting hold of the Russian market; they would, moreover, require to make up their minds to make some changes in their way of doing business; besides employing good representatives who thoroughly enjoy their confidence, they must be prepared to depart from some of their hard and fast rules; they must be prepared to concede longer credits up to six months instead of the usual one month, and also to be more considerate of the wishes of their customers respecting the dimensions and make up of the goods. The Germans have in these respects been much wiser and more conciliatory, and have tried harder to suit themselves to the purchasers' tastes and wishes than any other nationality exporting to Russia.

Agricultural Machinery for Bulgaria.

It is stated to be the intention of the Varnaer Permanenz-Kommission, an official institution to care for and foster the aims of the Bulgarian agriculturists, to send around a circular to all the farmers in Bulgaria, in which the latter are asked to specify all agricultural machinery and implements they are in need of. At the same time the farmers will be asked to remit the necessary funds for the purchase of this machinery, &c., to the Commission, which will buy all that is required at wholesale prices, and let the farmers have the goods at cost price. American exporters willing to sell their various implements in this country should address their offers to Herr Brzakoff, Landwirthschaftsinspektor des Varnaer Kreises, at Varna, Bulgaria.

American Competition Felt.

It is sometimes difficult to believe to what extent the influence of American Hardware and allied goods exercise upon the British market. A Liverpool firm, Messrs. Gandy of Seacombe, near Liverpool, have issued a circular, which runs as follows:

Every one is talking about American competition, but if people would only make up their minds to look into things, and see if the same class of article cannot be obtained from other sources, a great step would be taken to combat this. Our Dodge wood split pulleys are the best made wood split pulleys on the market, and are made in Canada, of Canadian hardwoods, and are superior in finish, strength and wear to any American or Continental wood pulley on the market.

Have our American friends concerned in this trade any answer to make to this indictment?

NEW YORK STATE HARDWARE JOBBERS' BUFFALO MEETING.

THE members of the New York State Hardware Jobbers' Association assembled at Weed & Co.'s establishment in Buffalo on Thursday morning, June 12, at 10 o'clock. From there they went to the Ferry street landing and took the steamer and sailed around Grand Island, about 12 miles in length, finally stopping at the Falconwood Club. Here with a beautiful house and very pleasant surroundings the members had an opportunity of enjoying outdoor sports, such as golf, croquet, &c.

The meeting was called to order at 1 o'clock by the president, J. H. Boucher. The following houses were represented:

J. M. Warren & Co., Troy, Gen. C. W. Tillinghast.
Albany Hardware & Iron Company, Albany, C. H. Turner.
Wright-Dana Company, Utica, A. J. Lowery.
Burhans & Black Company, Syracuse, Captain Burhans.
Syracuse Hardware & Iron Company, Syracuse, Joseph Born.
Barker, Rose & Clinton Company, Elmira, Capt. Frederick Barker.
Irving D. Booth, Elmira, Irving D. Booth.
Matthews & Boucher, Rochester, J. H. Boucher.
Weaver, Palmer & Richmond, G. D. Palmer.
Weed & Co., Buffalo, Hobart Weed.

The meeting lasted about two hours, and afterward dinner was served.

Among the guests present were the following: H. B. Lupton, vice-president of the Oliver Iron & Steel Company, Pittsburgh, Pa.; T. James Fernley, secretary and treasurer of the National Hardware Association; Chas. M. Jarvis, vice-president of the American Hardware Company, New Britain, Conn.; Howard H. Hart, vice-president of the Russell & Erwin Mfg. Company, New Britain, Conn.; George P. Hart, vice-president of the Stanley Works, New Britain, Conn.; E. H. Brooks of the American Tin Plate Company, New York City; T. Guilford Smith of the Carnegie Steel Company and the Illinois Steel Company; R. H. Plumb, president of the Buffalo Bolt Company, Buffalo, N. Y.

The members and their guests returned to the city about 7 o'clock, where they were entertained by Mr. Plumb at the Buffalo Club. Afterward they attended Victor Herbert's concert, concluding a very pleasant and profitable day.

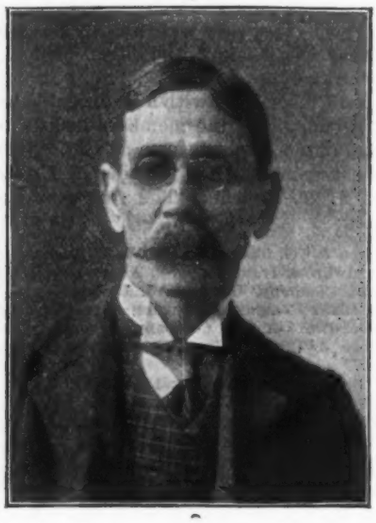
VAN VOORHIS & SANFORD'S NEW CATALOGUE.

VAN VOORHIS & SANFORD, Monterey, Nuevo Leon, Mexico, have issued illustrated Catalogue No. 12, of 80 pages, each 10 x 7 inches, describing a varied assortment of machinery and supplies suited to the wants of that country. The descriptive matter is in Spanish and English in parallel columns, there being eight pages of index divided equally between the two languages. Especial attention is drawn to the policy of the house in always endeavoring to handle only the best quality of goods, as well as to the fact that large increases have been made to their stock since the publication of their last catalogue.

DEATH OF THOMAS McCRACKEN.

THOMAS McCRACKEN, secretary of the Minnesota Retail Hardware Dealers' Association and also secretary of the Minnesota Retail Hardware Dealers' Mutual Insurance Company, died on the 11th ult., after an illness extending over a period of two months. His sickness and death was caused by septic blood poisoning, resulting from dental operations soon after the annual convention of the Minnesota Association in St. Paul, in February. Mr. McCracken had been a resident of the Northwest for over a quarter of a century and had been prominently identified with the retail Hardware business of Minneapolis for many years. Through the long illness which preceded his death, Mr. McCracken maintained a firm grasp on his work as secretary. Almost his last words were an inquiry of his son, who assisted him in his association work, if everything was in good shape at the office.

Mr. McCracken was 58 years of age and was born in Ohio. Coming from that State 27 years ago, his first position was with John S. Pillsbury & Co., one of the first retail Hardware concerns to engage in business on the west side of St. Anthony Falls. While in the



THOMAS McCRACKEN.

employ of this firm, Mr. Pillsbury sold out the controlling interest and the business was transacted under the name of Janney, Moles, Brooks & Co., and its successors to-day are Janney, Semple, Hill & Co. Mr. McCracken resigned a responsible position with this firm to become identified with Harrison, Knight & Co., and later withdrew from this firm to become manager of the H. D. Wood Hardware Company, who, under his direction, established the first Hardware jobbing house in Minneapolis. Later Mr. McCracken was engaged in the retail business on Plymouth avenue near Washington, and following that was for several years on the road as a Hardware traveler.

Mr. McCracken was elected secretary of the Minnesota Retail Hardware Association in the latter part of 1899, and was unanimously re-elected each year since that time. He was keenly interested in the association cause, and gave a great deal of time and energy to the work of promoting the association and increasing its scope and ability to accomplish good. Mr. McCracken administered his duties in such a manner that he won many friends. He was careful and painstaking in the performance of his duties, and brought the judgment of a ripe business experience to his aid which helped him greatly. Personally he had many admirable characteristics. He was broadminded and willing to overlook shortcomings in others. He was liberal in his views and always counseled moderation on the part of those members who were inclined to be radical and go too far in bringing recalcitrants in line. In many ways his character was an estimable one, and he will live long in the memory of hosts of intimate personal friends.

HARDWARE STORE WINDOW DISPLAY.

BY E. W. PETERSON.

WINDOW displays are but samples of good arrangement. As most people know, not every clerk or Hardwareman can make attractive displays. It is an art acquired only through practice and experience. Original ideas are the best in every way. Window trimmers know that more spirit and life is put into the work where original ideas are used than otherwise. When a good idea is carried out and displayed in neat and attractive style that display is generally left several weeks and then the following display is put in, in any haphazard way. This is not right at all, because when one's customers once learn that a merchant is regular in making new displays they come to see them and do not want to be disappointed. When the public stops and admires a window, more interest and spirit should be put into the next change. Try to improve in every display.

METHOD.

Never start out to make a display until you have in mind just what you want. Stepping stones of success are in the foundation and beginning. So it is in window trimming, "Well begun is half done." There must be method in this, as in all things in which there would be success. Displays should be changed every week at least, and when once in running order do not fail to keep the good work up.

One common mistake in arranging displays is that not enough time is spent on the arrangement. Do not leave a chance for passers by to criticise in any way. Spare time could not be used more advantageously than in trimming up the windows. New goods received should be put on display as soon as possible. Show them to the public—they are the purchasers.

The secret of window trimming lies in the keeping down of expense. Try to get up your own display racks, shelves, &c. Do not invest in high priced fixtures, but always get up displays with as little expense as possible.

INCREASE OF SALES.

Increase of sales is invariably noticed, and many times new customers are gained through attractive show windows. Every time a change of display is made some persons are sure to be attracted, and nine times out of ten one sells some article shown. To illustrate: At Christmas we had Rochester Nickel Plated Copper Ware in one window and had sold considerable of it to our town people, but had several pieces left and one article was a Chafing Dish. One evening a stranger came in the store and inquired the price. The clerk told him and at once he purchased it. After having paid for it he told us to express it to him the next day without fail, as he lived in another town. So one word led to another and the man told us had it not been for seeing it displayed in the window he would never have thought of it.

Attractive displays are cordial invitations to all, and when a new change is made the invitation is renewed. The result is that the public appreciate and accept the invitation.

PROTECT GOODS AGAINST FLIES.

Successful and hustling merchants never allow their window displays to look old or stale. This also applies to the stock in general. There is one season of the year when all precautions possible must be used to keep goods on display from looking old and shopworn, and that particularly during fly time. Buy a few yards of mosquito cloth and inclose the windows so as to keep the flies out entirely. Leave a door opening large enough, so in case it is necessary to show an article on exhibit it can be got without much trouble. More damage can be done to goods on display in windows by those pesky winged animals than in most any other way. Use mosquito cloth to cover Bird Cages, Lamps, Lanterns, &c.

Fly specked goods are a poor advertisement for any merchant.

KEEPING GOODS FRESH IN THE WINDOWS.

Do not place in the window goods that may be affected by the sun, unless they have an awning or other good protection. All labeled or varnished handled goods are easily affected by the heat of the sun. Care must be used in not letting people handle goods on display, because they are apt to leave finger marks, especially during 90 degrees in the shade weather. Another good suggestion—sell the sample on display whenever possible. Sometimes it may look a little shopworn, even after all precautions have been taken. Then replenish the display with a new piece from stock and the display is thus kept clean and fresh looking.

MARKING PRICES.

Window prices all depend on one's trade and conditions of competition. Prices on goods displayed in the window are many times trade winners, especially in large towns. In small towns prices on goods do not always sell the goods. Invite the public into the store and let them know their calling is appreciated. Try to get their confidence; tell them that any good legitimate competition will be met fairly. Nine cases out of ten some good has been done. Pleased customers are the best advertisements.

Neat window signs are suggested such as:

PRICES ARE WITHIN THE REACH OF ALL.
STEP IN AND GET OUR SPECIAL PRICES.
GREATLY REDUCED PRICES TO-DAY.
CASH PRICES ARE YOURS FOR THE ASKING.

TREATMENT OF THE WINDOW DRESSERS.

When an employee has taken pains to make attractive displays, his employer should always compliment and thank him for his efforts. When any chance for suggestions might be offered, help him in his work and be

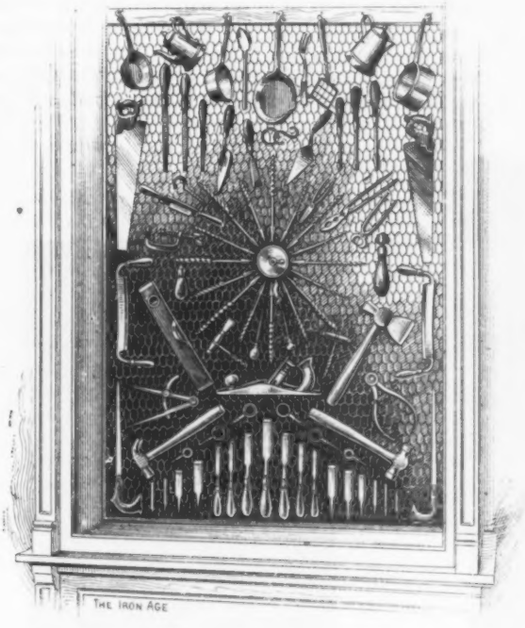


Fig. 1.—A Display Made on Poultry Wire Netting.

particular to notice his changes. Do not hurry him in his work of window trimming, but give him lots of time and encouragement.

When increased sales to any extent have come from a window display through the work of the employee compensate him. The employer will, in the end, be the gainer.

LOCAL PAPER ADVERTISING.

Local advertisements should work in unison with the window displays. As a matter of fact many customers are called to a store through the local advertisement. We all know many people do not get down town every day and they are kept in touch with your new goods and displays through the paper. Those who are interested will come down to see the exhibit before the change.

GOODS SHOWN ON POULTRY NETTING.

It is not always the goods displayed as much as the manner in which they are shown that attracts attention. Poultry Netting has been found a very useful article for making displays with. Take Netting, say, 5 feet wide and long enough to reach from ceiling to ledge of window and nail it to a strip of board about 2 inches wide and then fasten it to the ceiling. After having done so stretch it down to ledge and fasten with small staples. Use small hooks made from No. 14 or No. 15 Coppered Wire to hang goods on, as shown in Fig. 1. One particular object of using Netting is that it does not darken the store to amount to anything. It is very convenient for displaying Carpenter Tools and especially Shelf Hardware and Tinware. Do not use too many kinds of goods, but just enough to draw attention.

DISPLAYING CUTLERY.

Shears, Scissors, Razors, Pocket Cutlery, Butcher Knives, Bread Knives, Spoons, Table Knives and Forks make attractive displays. For displaying these goods use thin boards, say, ½ inch thick and about 15 x 20 in size. Cover the boards with velvet or other suitable

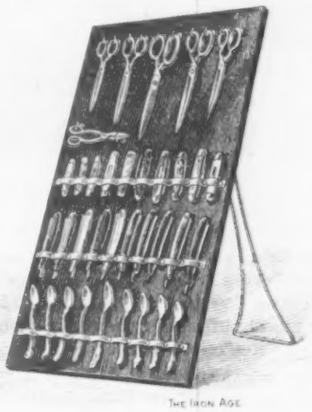


Fig. 2.—A Display Board.

cloth of different colors. To hang Shears, Scissors, &c., on these boards use small brass cup hooks, and for Knives, Spoons, &c., tack on some braid with brass beaded nails, making little loops to put Knives, &c., in. Attach a piece of wire to back of this cloth covered board, so that it will stand up like an easel, as illustrated in Fig. 2.

CONCLUSION.

Hardware window trimming is but in its infancy now. And but recently Hardware merchants have begun to realize its efficiency as a sales agent. All successful Hardware dealers depend somewhat on their window displays for drawing new as well as preserving the old trade. No window display, however neatly arranged, can attract attention unless the window glass is perfectly clean. Make your displays as different as possible from your competitors'. Work out ideas of your own.

KELLEY-HOW-THOMSON COMPANY.

THE KELLEY-HOW HARDWARE COMPANY and the Thomson-Glaskin Company, Duluth, Minn., have effected a consolidation of interests, under the style of Kelley-How-Thomson Company. The two houses have been handling two distinct lines of goods, but felt that they could serve their trade better if they increased their respective lines, and it was through the exchange of goods in filling orders that led up to the above organization. The lines of goods that will now be represented by the new company will include Shelf Hardware, Iron, Steel, Mining, Railroad and Lumbermen's Supplies and Rubber Goods. A new building, now in course of erection, will soon be occupied by the new company.

TOOL CABINETS.

As illustrating what may be done by an enterprising house to meet the wants of their trade in a special way we describe a line of Tool Cabinets which are designed and made by White, Van Glahn & Co., 15-17 Chatham square, and 49 East Forty-second street, New York. They have had a very satisfactory sale in connection with their retail department and have been found to attract different classes of buyers who desire Tool Cabinets for business or home use. It is not unlikely that other merchants throughout the country may find it desirable to act on the suggestion thus given and to make or have made for them a line of Tool Cabinets.

The Cabinet shown in Figs. 1 and 2 is made of selected, well seasoned oak, antique finish and polished, fitted with brass hinges and a two-keyed brass cylinder lock. The tools are held in place by special brass fastenings, and the drawer is locked by locking the door. The Cabinet has two paneled doors, 3 inches deep, distributing the weight on two pairs of hinges. The drawer has a depth of 9 inches. Attention is called to this special feature of the cabinet, it being pointed out that such a depth of drawer is impossible where doors close outside of the drawer. This is provided with various small compartments, filled with an assortment of Nails, Screws, Staples, Screw Hooks, Screw Eyes, Tacks, &c., all of which are constantly needed in a house. The tools contained in the Cabinet are referred to as tools, not toys, and as being of standard sizes carefully selected for practical use, bearing the imprint of manufacturers whose names have always stood for best quality. The Cabinet contains 45 tools, ready for use, and should the combination not meet the requirements of any individual, any size or style of outfit will be made up by the firm. Another Cabinet, No. 16, is made in every particular the same as the one illustrated, but is not fitted out with as complete an assortment of tools. The Cabinet shown in Figs. 3 and 4 is made of polished oak, antique finish, and is trimmed with brass hinges and lock. The tools are held in place by special brass fastenings. It contains the smallest assortment of tools that can be of practical use, and at the same time is large enough to do any ordinary job about a house. The tools are referred to as being of the same high grade as those provided with Cabinets Nos. 15 and 16. The No. 17 Cabinet is alluded to as being particularly desirable where a first-class tool chest is wanted for a boy.

Fig. 1.—Tool Cabinet No. 15.

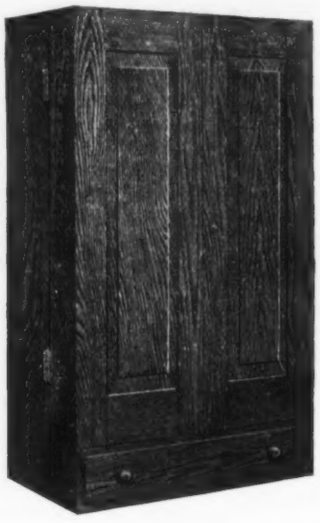


Fig. 2.—Tool Cabinet No. 15. Closed.

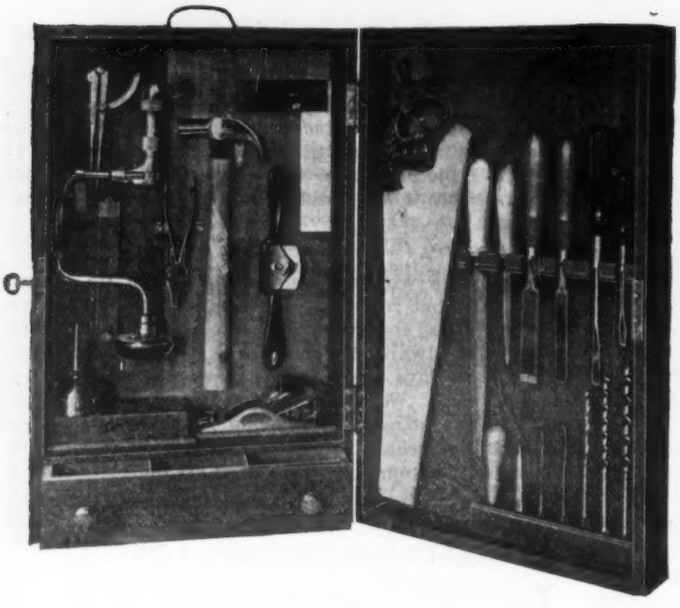


Fig. 3.—Tool Cabinet No. 17.

Fig. 4.—Tool Cabinet No. 17 Closed.

AMONG THE HARDWARE TRADE.

B. W. Crone has recently purchased the Hardware, Stove and Tin business of W. J. Ohlhieser, Juniata, Neb., and is continuing at the old stand.

W. S. Dieken, Hastings, Neb., is selling out his Hardware stock.

F. J. Mundt has disposed of his Hardware business in Humboldt, S. D., to Butt & Schaper, and has gone into the banking business, having been chosen cashier of the State Bank of Humboldt.

H. C. Barker, Commerce, Texas, has merged his business into a stock company, with a capital of $30,000, fully paid. The line of goods carried embraces Hardware, Farming Implements, Wagons, Buggies, groceries, &c.

A. F. Ladwig has sold his Hardware business in Hawkeye, Iowa, to A. Howard & Son.

Meyer & Soffel, Hardware, Stove and Agricultural Implement merchants, Maywood, Ill., have been succeeded by Frank Meyer.

Reed & Wheeless have sold their Hardware, Stove, Implement and Sporting Goods business in Hopkinton, Iowa, to G. W. Collins.

Wm. H. Munson of North Woodbury, Conn., has disposed of his Hardware, Stove, Plumbing and Tinning business to Strong & Munsell.

M. P. Gillette Hardware Company, Woodbine, Kan., have been succeeded by Woodbine Hardware & Furniture Company.

The Hardware store of Joseph Drummer, Custer, Ohio, was slightly damaged by fire a short time since. Mr. Drummer is again doing business as usual at the old stand.

C. E. Smith has purchased the interest of A. C. Hedden in the Hardware firm of Hedden & Crawford, Ithaca, N. Y., and the style is now Crawford & Smith.

D. D. Nelson, in the Hardware, Stove and Plumbing business in Granville, N. Y., has been succeeded by D. D. Nelson & Co.

Read & Snyder are successors to Henry Read in the Hardware, Farm Implement, Buggy and Wagon business in Petersburg, Ind.

The Ganado Hardware Company, Ganado, Texas, have been incorporated with a capital stock of $5000. The interested parties are W. A. Shutt, J. E. Shutt and John W. Tompkins.

D. B. Bradshaw, in the Hardware, Stove, Farm Implement and furniture business in Terral, Ind. Ter., has been succeeded by Bradshaw & Lewis.

Hall-Robertson Hardware Company, a new corporation, with a capital stock of $100,000, now at Fargo, N. D., will soon remove to Grand Forks, where they expect to be ready for business about August 1. The officers of the company are as follows: F. C. Hall, president; J. L. Robertson, secretary, and Alvin Robertson, treasurer. They will do an exclusively wholesale business in Shelf Hardware, Tinware and Sporting and Athletic Goods.

John Ernsdorff Iron Company are successors to John Ernsdorff & Sons Company in the wholesale Heavy Hardware, Iron, Wood Stock and Blacksmiths' Supply business, in Dubuque, Iowa.

THE NEW GOODRICH BALL BEARING SEWING MACHINES.

FOLEY & WILLIAMS MFG. COMPANY, Chicago, Ill., are distributing printed matter relating to their No. 1 New Goodrich sewing machines with ball bearings. The machines are furnished with different styles of oak cases, and are shipped subject to return at the manufacturers' expense if they are not found satisfactory after 30 days' trial and inspection. The machines are sold direct from the factory to the dealer, the company employing no traveling men. Many Hardware merchants are finding sewing machines a pleasant and profitable line to handle.

PRICE-LISTS, CIRCULARS, &c.

THE N. N. HILL BRASS COMPANY, East Hampton, Conn.: Illustrated catalogues and price-lists Nos. 20, 21 and 23. These relate respectively to Bicycle Bells, Hand, Door, Tea, Call and Team Bells and to Children's Bells and Toys.

THE "J." MFG. COMPANY, West Manchester, Ohio: Shovels, Spades, Scoops and Ditching Tools. An illustrated catalogue and price-list shows these goods in three grades. We are advised that 50 dozen Plain Back and 50 dozen Hollow Back Shovels, Spades and Scoops are now being manufactured daily, and that the company expect soon to increase the output to 150 dozen per day.

TARBOX & BOGART MFG. COMPANY, Cleveland, Ohio: Circulars describing the T. & B. Fruit Jar Wrench, the Tarbox Pillow Sham Holder and the T. & B. Jarring Outfit, of which they are manufacturers.

E. C. ATKINS & Co., Indianapolis, Ind.: A little booklet entitled "Knots: Can You Untie 'Em?" It contains a number of catch or trick problems designed to interest and instruct, being a companion book to "Mental Nuts." The publication also calls attention to Atkins' High Grade Saws.

THE AUTOMOBILE & CYCLE PARTS COMPANY, Elyria, Ohio: Catalogue illustrating Garford, Brown, Wheeler, Christy and Hunt Bicycle Saddles, also a line of Tool Bags.

ALVIN TAPLIN, Forestville, Conn.: Grain and Fertilizer Distributer. An illustrated folder describes the Distributor as being adjustable to any desired quantity of seed or fertilizer per acre.

GOODELL COMPANY, Antrim, N. H.; New York office, 10 Warren street: Parers. An illustrated pamphlet describes a number of Apple, Potato and Vegetable Parers, also a Cherry Stoner. In 1864, the pamphlet states, apple paring machines were first made by the president of this company.

AKRON MACHINE COMPANY, Akron, Ohio: A catalogue is devoted to Sections, Mowing Knives, Binder Sickles, Extra Heads, Guards and Guard Plates for all makes of mowers, binders and headers, &c.

THE HERCULES SPECIALTY COMPANY, Erie, Pa.: Ladders. An illustrated descriptive catalogue and price-list shows a variety of uses to which Sectional Ladders can be put, with and without Ladder brackets. Extension and Step Ladders, Adjustable Scaffold Jacks, Lawn Swings, Ironing Boards, &c., are also shown.

E. I. HORSMAN COMPANY, 354 Broadway, New York: Table Tennis and Table Tennis Tables. These are shown with prices on circulars.

MISCELLANEOUS NOTES.

Dayton's Fly and Mosquito Killer.

The Dayton Hardware Company, Portland, Ore., are offering their device for killing and removing insect pests from houses, sanitariums, hospitals, hotels, &c. The insect is killed by simply pushing the killer against it when resting on the ceiling or wall, and can be easily shaken off. It is killed, it is remarked, without being crushed and without soiling the most delicate wall or paper.

New Curry Comb Finishes.

W. & E. T. Fitch Company, New Haven, Conn., manufacturers of the genuine Fitch curry combs in a great variety of styles, sizes and finishes, have recently put on the market the Rustless and Bon Ton finishes, as applied to certain styles of curry combs. The Rustless is a mottled gray of attractive appearance, practically rust proof and durable. The Bon Ton they refer to as the handsomest finish they have ever applied to curry combs, described as a fine antique copper plate. The selling prices of either of these finishes are not greatly in excess of quotations on the more ordinary finishes.

E. C. Tecktonius' Specialties.

E. C. Tecktonius, Racine, Wis., is manufacturing a line of specialties, including malleable iron tank lugs, axle box presses, tire removers, clamp drills, bolster springs, wagon pole supports and detachable third seats for buggies.

Railroad Ticket Punch.

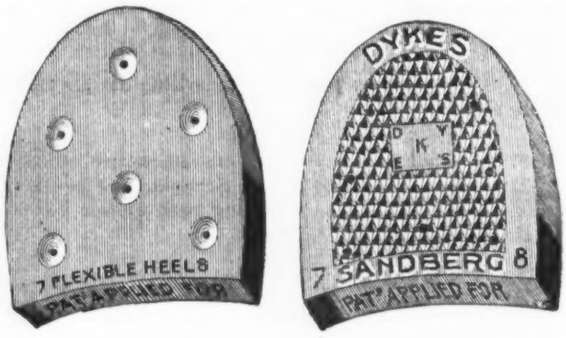
The railroad ticket punch herewith illustrated reduced in size is one of the latest productions of the Cincinnati Mfg. Company, Cincinnati, Ohio, for whom Lamar Van Syckel, 88 Chambers street, New York, wholesale dealer in hardware specialties and house furnishing goods, is the representative in all territory east of Pittsburgh. The punch is 5⅛ inches long, finely polished and nickeled, has a wire coil spring, will punch 1½ inches from margin, and can be supplied in designs having letters, stars, and double and triple dies, &c., in a total of 900 different patterns. Some of the improved features of this punch are the cutting away of the metal so that the user can see to punch out letters or figures more accurately than was formerly the case, together with a

Railroad Ticket Punch.

larger slot and more distended ends for quickly inserting the article to be punched. This company manufacture 30 different patterns and styles of ticket punches, varying widely in price according to the purpose for which they are intended, any of which it is possible to fit up with any of the 900 dies referred to, if ordered in sufficient quantities.

Rubber Heels.

The John L. G. Dykes Company and the Sandberg Bros. Mfg. Company have merged their interests in the Chicago Tire & Rubber Company, Chicago, Ill., manufacturers of rubber goods. The accompanying illustrations show two kinds of rubber heels which the company are putting on the market. One is known as the suction heel, washers being molded in the center to prevent the nails from pulling through; the other presents the corrugated face front. Each is made in five to



Rubber Heels.

seven different sizes. The same quality rubber is used, it is stated, as in the manufacture of rubber tires made by the same company.

Ideal Removable Platform and Striking Bag.

Treinis Brothers, 88 Chambers street, New York, manufacturers of high grade sporting goods, have just brought out a new punching bag and platform, for which patent is pending, as here illustrated. The Ideal

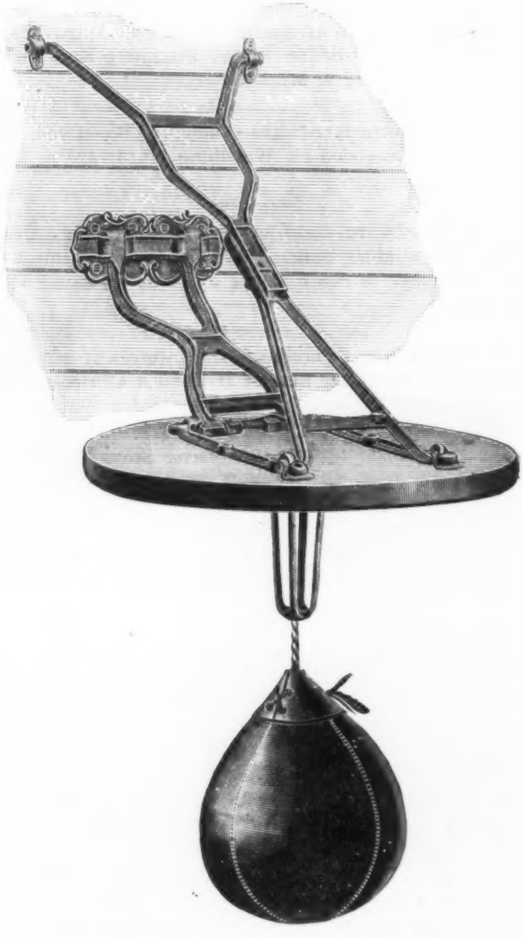


Fig. 1.—Ideal Removable Platform and Bag.

removable platform and striking bag, as it will be known by the trade, consists of a solid varnished circular oak platform, 18 inches in diameter and 1⅛ inches thick. The construction of the metallic portion of the platform is such that it can be quickly removed or put in position by a simple turn of a thumb screw, as indicated by Fig. 2, leaving only a small part of the appa-

ratus flat against the wall, and even this can be detached by the withdrawal of a few screws. This platform and bag has been devised to supply an increasing demand for indoor athletic apparatus of this character that is also unobjectionable in a home and not unwieldy in size or weight. It can be affixed to wall, door or fence. The No. 5 platform and bag has nickel plated frame work, selected napa tanned pear shaped bag with double stitched seams and pure gum bladder. It is put

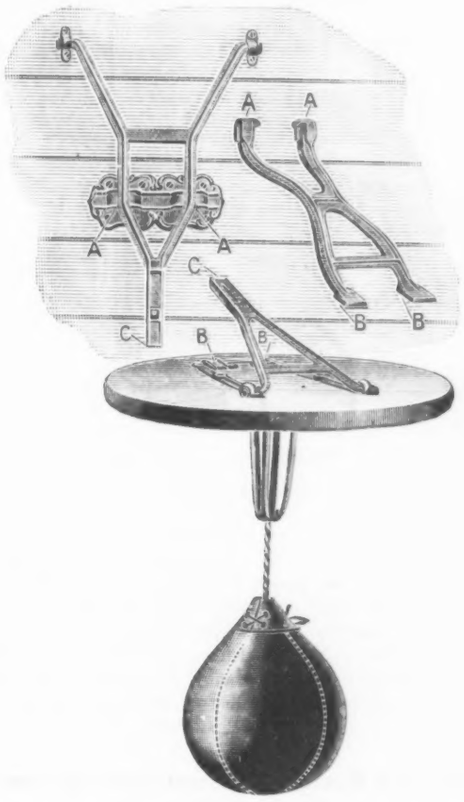
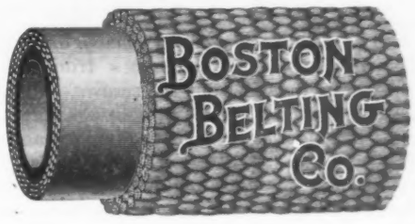


Fig. 2.—Showing Method of Disconnecting the Parts.

up with screws for erecting it and compactly packed in a box 18 x 19 x 3½ inches for shipment, weighing 16 pounds. There is also a No. 4 outfit, having the same general features, except that the frame work is finished in japan and gold and the bag has welted seams. The punching bags for Nos. 5 and 4 are 32 inches in circumference (diameter about 10 inches) and 12 inches high. A third outfit, No. 3, is made with black japanned frame work and pear shaped bag, 28 inches in diameter and 9 inches high, and which is more moderate in price. Steinfeld Brothers, 547 Broadway, dealers in athletic and sporting goods, are the sole agents for this series of apparatus.

The Universal Cotton Jacket.

The Boston Belting Company, Boston, Mass., are now prepared to weave over various kinds of rubber hose the

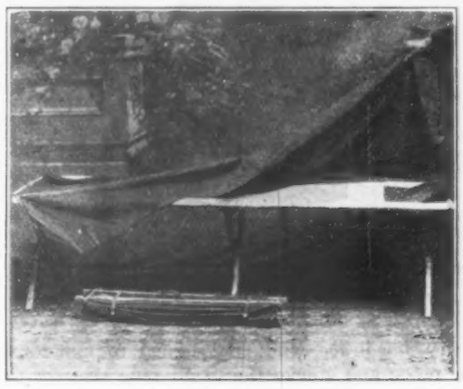


The Universal Cotton Jacket.

cotton jacket shown herewith. This is a heavy, seamless fabric, to increase the strength of hose and to add to its capacity for withstanding the wear and tear of being dragged about where the wear is hard, as when used by contractors and in mines. The jacket is painted to render it waterproof. The manufacturers state that it never kinks, does not get bent or out of shape and that it does not unwind should a single strand be cut. The jacket is applied to air, gas, water, steam, air and steam drill hose.

The Soldiers' Friend Camp Bed.

H. R. Wykert, 701 South Sixteenth street, Omaha, Neb., is offering the camp bed illustrated herewith. It is shown both open and folded, with sleeping bag attachment. The attachment is made of 10-ounce United States waterproof duck, in brown or dead grass color. This is referred to as an important feature, keeping out all cold air and dampness. The cot proper is made of 12-ounce United States waterproof brown duck, and the frame is made of best selected maple wood. The cot complete when spread out is 27 inches wide, 18 inches high, and 6 feet 6 inches long. When folded it measures 5 x 6 inches by 3 feet 3 inches long, making a neat



The Soldiers' Friend Camp Bed.

and compact package. The point is made that by not having any stretcher in the cot the sides are allowed to open by the weight of the person using it to the full extent of the canvas, so that when in use the canvas is always tight, making a comfortable bed. It folds without separation of parts. The manufacturer states that it is far better than a hammock and much better than a sleeping bag to lay on the ground.

The Navajo Cow Bell.

The Bevin Bros. Mfg. Company, East Hampton, Conn., are putting on the market the cow bell shown herewith. This is formed from wrought steel, is fur-

The Navajo Cow Bell.

nished with cast malleable iron loops, and is warranted by the manufacturers not to crack. The bell is copper and nickel plated in both 3⅜ and 5 inch diameters.

The Plumbers' Hollow Mill Saw.

The accompanying cuts relate to plumbers' hollow mill saws offered by the West Haven Mfg. Company, New Haven, Conn. The tool is intended for use in an

Fig. 1.—The Plumbers' Hollow Mill Saw.

ordinary bit brace, and is designed to make holes in waste pipes and stacks the exact pipe size for tapping in any material or for any connections where the pipes or appliances are already placed, often saving, it is stated, the cost of tearing out whole lengths of pipe with their expensive connections. It is explained that the tool obviates the use of a saddle hub in a great many cases and reduces the work of applying one to the minimum where it is required; also that in cases of stoppage in waste pipes a hole can be cut out and afterward plugged. The tool, it is pointed out, will often save the cost of taking nearly finished jobs apart

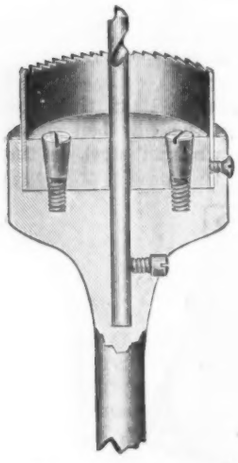


Fig. 2.—Construction of Plumbers' Hollow Mill Saw.

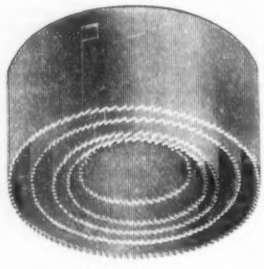


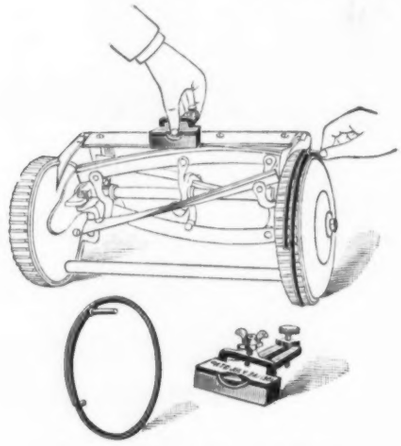
Fig. 3.—Extra Saws.

and carrying a portion to the workshop. The tool is made in five sizes—1, 1¼, 1½, 2 and 2½ inches—and packed in a wooden case, together with one extra set of saws and two drills with each set.

Holmes, Son & Harper, Hardware merchants, Farmer City, Ill., have been succeeded by Harper Bros.

The Easy Lawn Mower Grinder.

The accompanying cut represents a lawn mower grinder offered by the Snell Cycle Fittings Company, Toledo, Ohio. The grinder consists of an emery block held in a frame supplied with set screws. The band with a crank handle shown below the mower permits the blades to be revolved. In operation the mower is turned upside down on a box or bench, the grinder is set on the stationary cutting bar, adjusting it by the aid of the thumb screws so that the emery block will touch the

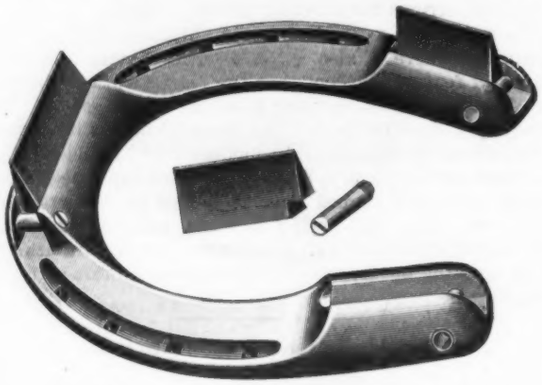


The Easy Lawn Mower Grinder.

rotating cutters as they pass under it. The crank is attached to the wheel and the grinding block is slid along the bar with one hand, while the cutters are rapidly revolved by turning the crank with the other hand. The manufacturers state that the grinder will sharpen a mower more than fifty times, and that after the first sharpening it is only necessary to pass the grinder once across as lightly as possible four or five times each season to keep a mower cutting nicely.

Meyer's Removable Steel Calk Horseshoe.

The accompanying illustration shows a removable steel calk horseshoe manufactured by Otto A. Meyer



Meyer's Removable Steel Calk Horseshoe.

Company, Milwaukee, Wis. The shoes are made of crucible steel and the calks of tool steel. The calks when dull can be replaced by sharp ones in a few minutes without pulling the shoes from the horse's hoofs by simply drawing out the screws, sliding out the dull calks, sliding in the sharp ones and replacing the screws. The shoes have been thoroughly and severely tested by the manufacturers. They also claim the use of the shoe wil save one-half to three-fourths of the cost of shoeing; will save more than three-quarters of the time spent in the blacksmith shop, and will save more than three-fourths the wear and tear of the hoofs caused by the frequent tearing off and resetting of the shoes. The statement is made that they will greatly improve the action and gait of the horse and will prevent and cure interfering.

The Lane Hinged Door Hanger.

The accompanying cuts relate to a barn or warehouse door hanger being placed on the market by Lane Brothers Company, Poughkeepsie, N. Y. The hanger, shown in Fig. 1, is made with an all steel frame in two parts, which are detachable. This construction allows one

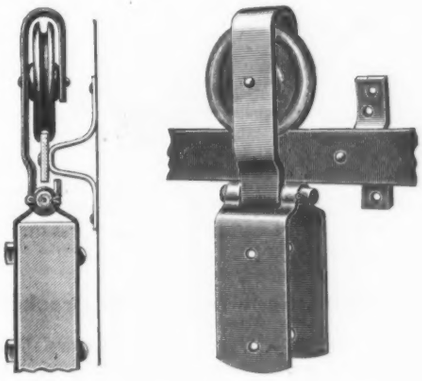


Fig. 1.—The Lane Hinged Door Hanger.

part to be secured to the door and the other to be placed on the rail separately, then when the door is brought into position the hinge bolt is inserted, thus joining the two parts together. When the two sections of the hanger are connected it cannot get off the rail, it is explained, except at the end, yet if the lower part is removed the hanger can be taken off the track anywhere throughout its length. With a hinged hanger of this kind there is a certain amount of flexibility at the top of the door even if it is held from swinging out at the bottom, and, it is remarked, a slight warping of the door will be compensated for by the hanger. The wheel, Fig. 2, is supplied with the regular Lane roller bearings,

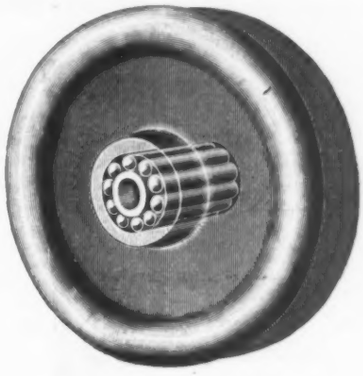


Fig. 2.—The Lane Roller Bearings.

in which a number of rollers revolve about a bushing, the bushing being solidly clamped between the two sides of the hanger frame to make the hanger rigid and strong. The hanger is adapted to the regular O. N. T. rail. It may be used on narrower rail, in which case, however, it is stated, it will not be positively tied on the track.

The Tokheim Measuring Pump.

The Tokheim Mfg. Company, Cedar Rapids, Iowa, are offering the oil and gasoline measuring pump shown herewith. The pump, illustrated in Fig. 1, can be set in any convenient location in the store, as it is not necessary to set the pump on the tank nor directly over the tank in the basement, as it will draw oil, it is explained, 1000 feet from any angle if desired. This allows the merchant to place the oil tank underground at a fire proof distance from the building, where the oil supply is out of the frost in winter and out of the sun in summer and always convenient for filling. The pump is all metal and is referred to as being fume and vapor tight. The tank is supplied with a float indicator, also a 1¼-inch shut off valve on the supply pipe, so that in case of fire in the store the valve can be closed to protect against explosion and burning of the oil. The special feature of the pump is the dome shown in Fig. 2.

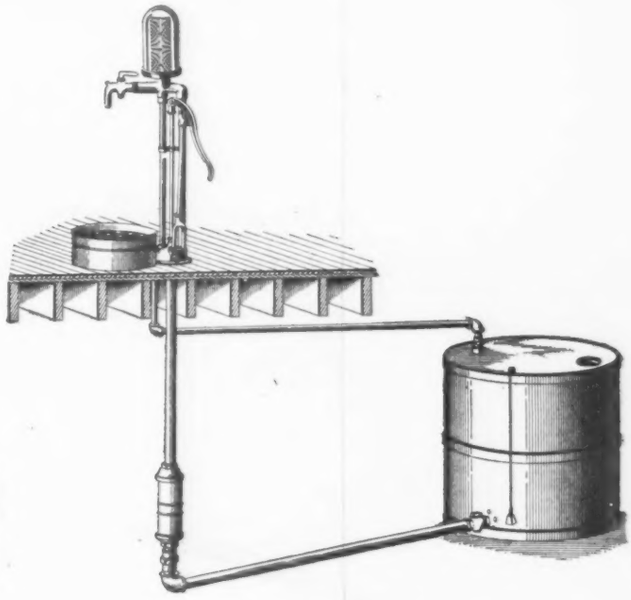


Fig. 1.—The Tokheim Measuring Pump.

This is made of heavy flint glass, hand engraved, and, it is stated, measures a gallon or part of a gallon, United States standard, correctly. The manufacturers explain that it computes a gallon or any fraction of a gallon, from 1 cent's worth up, at any price, money value, in plain sight of the merchant and the customer. The pump does not depend upon the cylinder for the measurement and therefore, it is remarked, can be operated more easily than if a tight packing was required on the

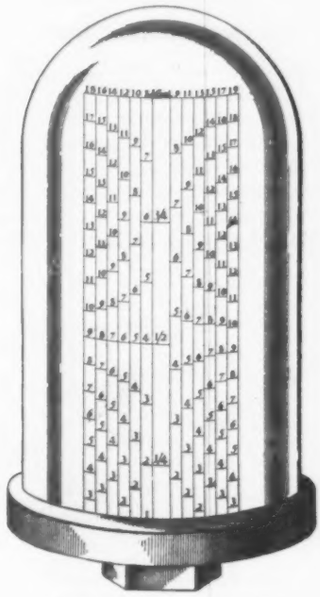


Fig. 2.—The Glass Dome.

plunger in the cylinder; also that the wear on the cylinder has no effect on the measurement. The company make a specialty of extra heavy steel oil tanks for underground purposes, rust proof outside. The point is made that the foregoing device for handling oils and gasoline is highly recommended by insurance companies and city fire departments.

The Iver Johnson Junior Single Gun.

The accompanying illustrations represent two styles of single gun for boys, put on the market by the Iver Johnson Arms & Cycle Works, Fitchburg, Mass. This

Fig. 1.—Junior Top Snap Gun.

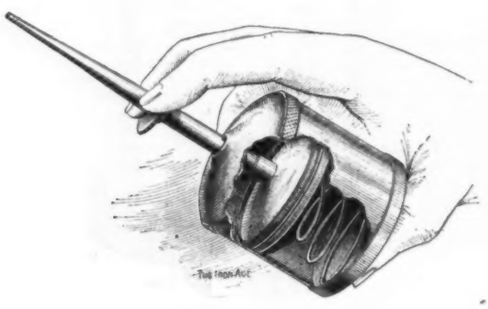
is referred to as a counterpart of their regular single, except in dimensions. In Fig. 1 is shown the top snap automatic ejector, while Fig. 2 illustrates the semihammerless automatic ejector. Like their standard gun, the manufacturers remark, it is quick and positive in action and safe in any position. The semihammerless gun can be opened, closed and fired, it is explained, without changing the position of the hand. It has single locking bolt, center hammer, rebounding lock, &c. Both styles

Fig. 2.—Junior Trigger Action Gun.

of guns have a new feature, a set screw by which the gun can be made either automatic ejector or non-ejector at the option of the user. The semihammerless gun is provided with a flush head locking bolt, another new feature, which takes the place of the protruding style commonly used. This construction permits of a perfectly smooth hand rest, it is pointed out, and also greatly improves the appearance of the gun.

The Automatic Oiler.

The Rochester Automatic Oiler & Supply Company, 206 Mill street, Rochester, N. Y., are offering the automatic oiler herewith illustrated. It is made of No. 20 gauge cold rolled Swedoh steel, copperized, and holds a fraction less than ½ pint of oil. When filling the can the spout is depressed, as shown in the cut, forcing the air out and causing a vacuum. The end of the spout, while thus depressed, is inserted in oil and the

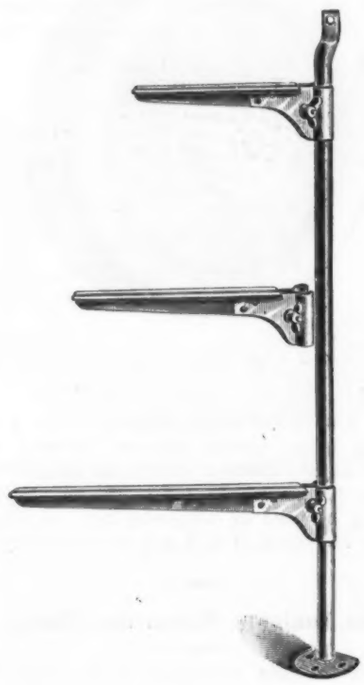


The Automatic Oiler.

oil is at once forced into the can, taking the place of the air ejected. It is remarked that it is impossible to overfill the can; therefore there is no waste of oil and no greasy oiler. When oil is required it is obtained by pressing the spring bottom, or if a quantity is desired the spout is depressed, forcing out a stream to a distance of 4 to 6 feet, it is explained, depending on the force used. The point is made that nothing can go into the oiler except through the spout, the smallest part of the oiler; that there can be no stopping of the spout, as flies, shavings and lint cannot be taken in, and that whatever goes in must come out, as the pressure of the button forces it out.

The Melchior-Kade Adjustable Brackets.

Melchior-Kade adjustable brackets, shown herewith, are offered by the American Nickel Works, Chicago. The brackets are made of wrought steel stamped on the knife edge principle, and one can be put on or taken off the back of a sliding bar, without disturbing or removing any of the other brackets, by loosening the thumb screw, allowing the jaws to open. The brackets are designed for wall shelves, wall and combination



The Melchior-Kade Adjustable Brackets.

cases. They are rigid, and when the thumb screw is drawn tight are referred to as safe, the clamp having a 3-inch hold on each side of the back bar or 6 inches in all.

Current Hardware Prices.

REVISED JUNE 17, 1902.

General Goods.—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

Special Goods.—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

Range of Prices.—A range of prices is indicated by means of the symbol @. Thus 33⅓@33⅓&10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent. discount.

Cut Prices.—*In the present condition of the market there is a good deal of cutting of prices by the jobbing trade, whose quotations are often lower than those of the manufacturers.*

Names of Manufacturers.—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE DIRECTORY, issued April, 1902), which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

Standard Lists.—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

Additions and Corrections.—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

Adjusters' Blind—
Domestic, ₩ doz. $3.00.....33⅓%
North's.....10%
Zimmerman's—See *Fasteners, Blind.*

Window Stop—
Ives' Patent.....25&5%
Taplin's Perfection.....25&5%

Ammunition—See *Caps, Cartridges, Shells, &c.*

Anvils—American—
Armand Hammer, Wrought ₩ lb 8½@8¾¢
Buel Patent Trenton.....₩ lb 9½@9¾¢
Eagle Anvils.....₩ lb 7¼@7¾¢
Hay-Budden, Wrought.....9¢@9¼¢
Horseshoe brand, Wrought.....9¢@9¼¢

Anvil, Vise and Drill—
Millers Falls Co., $18.00.....50&10%

Apple Parers—See *Parers, Apple, &c.*

Aprons, Blacksmiths'—
Hull Bros. Co.:
Lots of 1 doz.....25%
Smaller Lots.....20%
Lots of 3 doz.....30%

Augers and Bits—
Com. Double Spur.....70@70&10%
Boring Machine Augers...70@70&10%
Car Bits, 12-in. twist.....60@60&10%
Jennings' Pattern Auger Bits.....50&10&5@60%
Ford's Auger and Car Bits.....40&10%
Forstner Pat. Auger Bits.....25%
C. E. Jennings & Co.:
No. 10 ext. lip, R. Jennings' list 25&10%
No. 30, R. Jennings' List..40&7½&10%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits.....15&10%
Mayhew's Countersink Bits.....45%
Millers' Falls.....50&10&7½%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....50&10%
Snell's Car Bits, 12-in. twist.....60%
Wright's Jennings Bits (R. Jennings' list).....50%

Bit Stock Drills—
Standard List.....65@65&5%

Expansive Bits—
Clark's small, $18; large, $26.....50&10%
Lavigne's Clark's Pattern, No. 1, ₩ doz., $26; No. 2, $18.....50&10%
C. E. Jennings & Co., Steer's Pat..25&10%
Swan's.....60%

Gimlet Bits—
Common Double Cut..gro. $2.35@2.75
German Pattern.....gro. $4.00@4.75

Hollow Augers—
Bonney Pattern, per doz. $11.00@11.50
Ames.....25&10%
New Patent.....25&10%
Universal.....20%
Wood's Universal.....25%

Ship Augers and Bits—
Ford's.....40%
Snell's.....40%
C. E. Jennings & Co.:
L'Hommedieu's.....15&10%
Watrous'.....33⅓&10%

Awl Hafts, See *Hafts, Awl.*

Awls—
Brad Awls:
Handled.....gro. $2.75@3.10
Unhandled, Shouldered..gro.65@68c
Unhandled, Patent.....gro. 66@70c
Peg Awls:
Unhandled, Patent....gro. 31@34c
Unhandled, Shouldered..gro.65@70c
Scratch Awls:
Handled, Common..gro. $3.50@4.00
Handled, Socket..gro. $11.50@12.00

Awl and Tool Sets—See *Sets, Awl and Tool.*

Axes—
First Quality, factory brands...$6.00
First Quality, jobbers' brands...$5.75
Second Quality.....$5.00@5.25

Axle Grease—See *Grease, Axle.*

Axles—
Iron or Steel.
Concord, Loose Collar....4½@5c
Concord, Solid Collar....4¾@5½c
No. 1 Common.....3½@3¾c
No. 1 & Com. New Style..3¼@4 c
No. 2, Solid Collar.....4¼@4½c
Nos. 11 to 14.....70@70&10%
Nos. 15 to 18.....75@75&10%
Nos. 19 to 22.....75@75&10%
Cash 10 days.

Boxes, Axle—
Common and Concord, not turned.. lb. 4¼@4½c
Common and Concord, turned.... lb. 4¾@5c
Half Patent.....lb. 8@9c

Balances—
Sash—
Caldwell new list.....50%
Pullman's.....60%

Spring—
Spring Balances.....50&10@60%
Chatillon's:
Light Spg. Balances.....40&10%
Straight Balances.....40%
Circular Balances.....50%
Large Dial.....30%
Peloube.....50%

Barb Wire—See *Wire, Barb.*

Bars—
Crow—
Steel Crowbars, 10 to 40 lb., per lb.. 2¾@3c

Beams, Scale—
Scale Beams, List Jan. 12, '82.40&10%
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

Beaters—
Egg—
Standard Co.: ₩ gro.
No. 0 Rapid.....$4.50
No. 10 Dover Family Size.....$8.00
No. 15 Dover Hotel Size.....$15.00
Rival.....$9.00
Taplin Mfg. Co.: ₩ gro.
No. 69 Improved Dover.....$6.50
No. 75 Improved Dover.....$7.50
No. 75-2 Imp'd Dover, Tin'd.....$9.00
No. 100 Improved Dover.....$8.00
No. 102 Improved Dover, Tin'd..$9.50
No. 150 Improved Dover, Hotel..$15.00
No. 152 Imp'd Dover, Hotel, T'd.$17.00
Lyon's, Standard size.....₩ doz. $1.75
Wonder (S. S. & Co.).....₩ gro. $7.50

Bellows—
Blacksmith, Standard List.70@70&10%

Blacksmiths'—
Inch..	30	32	34	36	38	40
Each..	$3.50	3.75	4.25	4.80	5.35	6.15

Extra Length: Each..$4.00 4.55 5.10 5.60 6.40 7.50

Molders—
Inch..	9	10	11	12	14	16
Doz..	$6.75	7.25	8.50	9.50	12.00	14.50

Hand—
Inch...	6	7	8	9	10	12
Doz....	$3.75	4.25	4.50	5.00	5.7	6.75

Net Prices.

Bells—
Cow—
Ordinary goods.....75&5@75&10%
High grade.....70@70&10%
Jersey.....75&10%
Texas Star.....50%

Door—
Abbe's Gong.....45%
Barton Gong.....55%
Home, R. & E. Mfg. Co.'s.....55&10%
Lever and Pull, Sargent's....60&10&10%
Yankee Gong.....35%

Hand—
Hand Bells, Polished....60&5@60&10%
White Metal.....55@55&10%
Nickel Plated.....50@50&10%
Swiss.....60@60&7½%
Silver Chime.....33⅓@33⅓&10%

Miscellaneous—
Farm Bells.....lb. 2@2¼c
Steel Alloy Church and School.....60%
National Bell Foundry Co.:
Superior Cast Steel Church and School Bells.....50&10&5@60%
Wilmot & Hobbs Mfg. Co., Gongs.....70%
Trip Gong Bells.....55&10@60%

Belting—Rubber—
Agricultural (Low Grade).75&10@80%
Common Standard.....75@75&10%
Standard.....70@70&10%
Extra.....60&10&5%
High Grade.....50&10@50&10&5%
Boston Belting Co.:
Seamless Stitched, Imperial.....45&5%
Boston.....50&5%
Niagara.....60&5%

Leather—
Extra Heavy, Short Lap...50&10@60%
Regular Short Lap.....60@60&5%
Standard.....60&10@65&10%
Light Standard.....65@70%
Leather Lacing.....60&10%

Cotton—
Rossendale-Reddaway B. & H. Co.:
Sphinx Brand.....60&10%
Durable Brand.....70%

Bench Stops—See *Stops, Bench*

Benders and Upsetters, Tire—
Detroit Perfected Tire Bender.....40%
Green River Tire Benders and Upsetters.....20%
Detroit Stoddard's Lightning Tire Upsetters, No. 1, $8.75; No. 2, $6.50; No. 3, $9.50; No. 4, $14.75. No. 5, $18.75.

Bicycle Goods—
John S. Leng's Son's 1902 list:
Chain.....50%
Parts.....50%
Spokes.....50%
Tubes.....60%

Bits—
Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

Bit Holders—See *Holders.*

Blind Adjusters—See *Adjusters, Blind.*

Blind Fasteners—See *Fasteners, Blind.*

Blind Staples—See *Staples, Blind.*

Blocks—
Tackle—
Common Wooden.....70&10@75%
Cleveland Steel.....60&60&10%
Ford's Star Brand Self Lubricating.. 60&10%
Hollow Steel, Ford's Pat. Star Brand.... 50&10%
Lane's Patent Automatic Lock and Junior.....30%
Stowell's Novelty, Mal. Iron.....50&10%
See also *Machines, Hoisting.*

Boards Stove—
Zinc, Crystal, &c.....40@40&10%

Bolts—
Carriage, Machine &c.—
Common, list Feb. 1, '02.....60&5@..%
Norway Iron, $3.00, list Jan. 1, '99 80@80&5%
Phila. Eagle, $3.00 list May 24, '99.... 80@80&5%
Bolt Ends, list Feb. 14, '95...70&5@..%
Machine, list Oct. 1, '99.....65&5@..%
Machine with C & T. Nuts.... 65&7½@..%

NOTE.—*Jobbers are in many cases underselling the manufacturers.*

Door and Shutter—
Cast Iron Barrel, Round Brass Knob:
Inch.....	3	4	5	6	8
Per doz...	$0.26	.30	.39	.47	.65

Cast Iron Spring Foot:
Inch.....	6	8	10
Per doz.....	$1.00	1.25	1.75

Cast Iron Chain, Flat, Japanned:
Inch.....	6	8	10
Per doz.....	$0.75	1.05	1.30

Cast Iron Shutter, Brass Knobs:
Inch.....	6	8	10
Per doz.....	$0.57	.80	1.00

Wrought Barrel Brass Knob:
Inch.....	3	4	5	6	8
Per doz...	$0.44	.50	.61	.70	1.28

Wrought Barrel ....75&5@75&10&5%
Wrought " Bronzed..40&5@50&10%
Wrought Flush, B. K..50&10@60&10%
Wrought Shutter...40&10&10@60&5%
Wrought Square Neck.....50@50&10%
Wrought Sunk.....50@50&10%
Ives' Patent Door.....60%

Stove and Plow—
Plow.....60&5@..%
Stove.....77½%

Tire—
Common.....77½%
Norway Iron.....80@80&5%
American Screw Company:
Norway Phila., list Oct. 16, '94....82½%
Eagle Phila., list Oct. 16, '94.....85%
Bay State, list Dec. 28, '99.....77½%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '84..82½%
Eagle Phila., list Oct. 16, '84.....85%
Eclipse, list Dec. 28, '99.....77½%
Port Chester Bolt & Nut Company
Empire, list Dec. 28, '99.....77½%
Keystone Phila. list Oct. '84.....85%
Norway Phila., list Oct. '84.....82½%
Unson Nut Co.:
Tire Bolts.....77½%

Borers, Tap—
Borers Tap, Ring, with Handle:
Inch.....	1¼	1½	1¾	2
Per doz..	$4.30	5.00	5.75	7.25
Inch.....	2¼	2½		
Per Doz.....	$8.65	11.50		

Enterprise Mfg. Co., No. 1, $1.35; No. 2, $1.65; No. 3, $2.50 each.....35%

Boring Machines—See *Machines, Boring.*

Boxes, Mitre—
C. E. Jennings & Co.....25&10%
Langdon.....15&10%
Seavey's, per doz., $30.....40%

Braces—
NOTE.—*Most Braces are sold at net prices.*
Common Ball, American..$1.15@1.25
Barber's.....50&10&10@50&10%
Fray's Genuine Spofford's.....40%
Fray's No. 70 to 120, 81 to 123, 207 to 414.....60%
C. E. Jennings & Co.....50&5&10%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Patent..50%
Millers Falls Drill Braces.....25&10%
P., S. & W. Co. Peck's Patents60&10&65%

Brackets—
Wrought Steel.....75&5@75&10%
Bradley's Wire Shelf:
Full cases.....80&10%
Broken cases.....80%
Griffin's Pressed Steel.....75%
Griffin's Folding Brackets.....70&10%

Bright Wire Goods—See *Wire and Wire Goods.*

Broilers—
Wire Goods Co.....75@75&10%

Buckets, Well and Fire—See *Pails*

Bucks, Saw—
B. & S.....₩ gro. $48.00
Hoosier.....₩ gro. $36.00

Bull Rings—See *Rings, Bull.*

Butts—
Brass—
Wrought list Sept., '96.....30@30&5%
Cast Brass, Tiebout's.....50%

Cast Iron—
Fast Joint, Broad.....50@50&10%
Fast Joint, Narrow.....50@50&10%
Loose Joint.....70&5@70&10%
Loose Pin.....70&5@70&10%
Mayer's Hinges.....70&5@70&10%
Parliament Butts.....70&5@70&10%

Wrought Steel—
Table and Back Flaps.....60%
Narrow and Broad.....60%
Inside Blind.....60&10%
Loose Pin.....60&10%
Loose Pin, Bali and Steeple Tip.....75%
Japanned, Ball Tip Butts...60%
Bronzed Wrt. Nar. and Inside Blind Butts.....45&20@45&25%

Extra 25@ 2 & 10%

Cages, Bird—
Hendryx, Brass:
3000, 5000, 1100 series.....5%
1200 series.....33⅓%
200, 300, 600 and 900 series.....40&10%
Hendryx Bronze:
700, 800 series.....40&10%
Hendryx Enameled.....40&10%

Calipers—See *Compasses.*

Calks. Toe and Heel—
Blunt, 1 prong.....per lb..4@4½c
Sharp, 1 prong.....per lb. 4½@4½c
Perkins' Blunt Toe.....₩ lb 3½¢
Perkins' Sharp Toe.....₩ lb 4 ¢

Can Openers—See *Openers, Can*

Cans, Milk—
	5	8	10 gal.	
Illinois Pattern.	$1 75	2.10	2.25	each.
Iowa Pattern...	2.40	2.60	each.	
Buffalo Pattern.	2.30	2.50	each.	
	20	30	40	qts.
New York Patt'rn	3.00	3.25	3.40	each.
Baltimore Patt'rn	2.50	2.85	3.10	each.

Cans, Oil—
Buffalo Family Oil Cans:
	5	10 gal.
	$48.00	60.00 108 gro

Caps—Percussion—
Eley's E. B.....60c
G. D.....per M 32@34c
F. L.....per M 42@..c
G. E.....per M 47@50c
Musket.....per M 62@..c

Primers—
Berdan Primers, $1.00 per M.....5%
B. L. Caps (Sturtevant Shells) $1.00 per M.....5%
All other primers per M. $1.22@$1.27

Carpet Stretchers—See *Stretchers, Carpet.*

Cartridges—

Blank Car ridges:
32 C. F., $5.50 ..... 10@5%
38 C. F., $7.00 ..... 10@5%
22 cal. Rim, $1 50 ..... 10@5%
32 cal. Rim, $2.75 ..... 10&5%
B. B. Caps, Con., Ball Swgd $1 90
B. B. Caps, Round Ball $1.40
Central Fire 25%
Target and Sporting Rifle ..... 15@5%
Primed Shells and Bullets ..... 15@10%
Rim Fire Sporting 50%
Rim Fire, Military ..... 15@5%

Casters—

Bed ..... 70@10@70@10&5%
Plate ..... 75@10@75@10&5%
Philadelphia ..... 75@10@75@10@5%
Boss ..... 70@10%
Boss Anti-Friction ..... 70@10%
Martin's Patent (Phoenix) 45%
Payson's Anti-Friction ..... 70@10@10%
Standard Ball Bearing 45%
Tucker's Patent low list 30%

Cattle Leaders—

See *Leaders. Cattle.*

Chain, Coil—

American Coil, Jobbers' Shipments:

3-16	1/4	5-16	3/8	7-16	1/2	9-16
8.70	6.35	5.30	4.50	4.30	4.20	4.25
5/8	3/4	7/8	1 to 1¼ inch.			
4.10	4.15	4.15	4.15	per 100 lb.		

German Coil ..... 60&10@10%

Halters and Ties—

Halter Chains ..... 60@10@60@10@10%
German Halter Chain, list July 24, '97 ..... 60&10@60&10@10@5%
Cow Ties ..... 60@60@5%

Trace, Wagon, &c.—

Traces, Western Standard: 100 pair
6½—6-3, Straight, with ring ... $30.00
6½—6-2, Straight, with ring .. $31.00
6½—8-2, Straight, with ring .. $35.00
6½—10-2, Straight, with ring .. $38.00
Add 2¢ per pair for Hooks.
Twist Traces 2¢ per pair higher than Straight Link.
Trace, Wagon and Fancy Chains .. 50&10@50@10@5%

Miscellaneous—

Jack Chain, list July 10, '93:
Iron ..... 60@10@60@10@10%
Brass ..... 60@10@60@10@10%
Safety Chain ..... 70&5@70@10%
Gal. Pump Chain ..... lb. 4@4½c
Covert Mfg. Co.:
Breast ..... 35&2%
Halter ..... 35&2%
Heel ..... 35&2%
Rein ..... 35&2%
Stallion ..... 35&2%
Covert Sad. Works:
Breast 70%
Halter 70%
Hold Back 70%
Rein 70%
Oneida Community:
Am. Coil and Halters ..... 40@45&5%
Am. Cow Ties ..... 45@50%
Eureka Coil and Halter ..... 45@50&5%
Niagara Coil and Halters ..... 45@50&5%
Niagara Cow Ties ..... 45&5@50&10&5%
Wire Dog Chains ..... 45@50&5%
Wire Goods Co.:
Dog Chain ..... 70&10%
Universal Dbl-Jointed Chain 50%

Chalk—(From Jobbers.)

Carpenters' Blue ..... gro. 42@45c
Carpenters', Red ..... gro. 37@40c
Carpenters', White ..... gro. 33@35c
See also Crayons.

Chalk Lines—See *Lines.*

Checks, Door—

Bardsley's ..... 40&10%
Columbia ..... 50&10%
Eclipse 60%

Chests, Tool—

American Tool Chest Co.:
Boys' Chests, with Tools 35%
Youths' Chests, with Tools 40%
Gentlemens' Chests, with Tools 30%
Farmers', Carpenters', etc., Chests, with Tools 20%
Machinists' and Pipe Fitters' Chests, Empty 50%
C. E. Jennings & Co.'s Machinists' Tool Chests ..... 33⅓&10%

Chisels—

Socket Framing and Firmer

Standard List ..... 70@10@10%
Buck Bros 30%
Charles Buck 30%
C. E. Jennings & Co. Socket Firmer No. 10 ..... 60&10%
C. E. Jennings & Co. Socket Framing No. 15 ..... 60&10%
Swan's 70%
L. & I. J. White ..... 30@30&5%

Tanged—

Tanged Firmers ..... 40@5@40&10%
Buck Bros 30%
Charles Buck 30%
C. E. Jennings & Co. Nos. 191, 181 ..... 16⅔&10%
L. & I. J. White, Tanged ..... 35&5%

Cold—

Cold Chisels, good quality ..lb. 13@15c
Cold Chisels, fair quality ..lb. 11@12c
Cold Chisels, ordinary ..... lb. 8@9c

Chucks—

Beach Pat., each $8.00 ..... 20%
Massey's Planer and Milling ..... 15@20%
Pratt's Positive Drive 25%
Empire 25%
Blacksmiths' 25%
Skinner Patent Chucks:
Combination Lathe Chucks 40%
Drill Chucks, Patent and Standard 30%
Drill Chucks, New Model 25%
Independent Lathe Chucks 40%
Improved Planer Chucks 25%
Universal Lathe Chucks 40%
Face Plate Jaws 40%
Standard Tool Co.:
Improved Drill Chuck 45%
Union Mfg. Co.:
Combination 40%
Cam Drill 30%
Geared Scroll 30%
Independent 40%
Union Drill 30%
Universal 40%
Face Plate Jaws 35%

Clamps—

Adjustable, Hammers' ..... 20@20&5%
Cabinet, Sargent's ..... 50&10%
Carriage Makers', P., S. & W. Co. 50%
Carriage Makers' Sargent's 60%
Besly, Parallel ..... 33⅓&10%
Lineman's, Utica Drop Forge & Tool Co. 40%
Saw Clamps, see *Vises, Saw Filers'.*

Cleaners' Sidewalk—

Star Socket, All Steel ..... ₱ doz. $4.00 net
Star Shank, All Steel ..... ₱ doz. $3.75 net
W. & C. Shank, All steel, 7½ in. ₱ doz., $3.05; 8 in., $3.10; 8½ in., $3.25.

Cleavers, Butchers'—

Foster Bros. 30%
New Haven Edge Tool Co.'s 45%
Fayette R. Plumb ..... 33⅓&33⅓&10%
P., S & W ..... 50@50&5%
L. & I. J. White 25%

Clippers—

Chicago Flexible Shaft Company
Handy Toilet ..... ₱ doz. $7.20
Mascotte Toilet ..... ₱ doz. $3.40
Monitor Toilet ..... ₱ doz. $9.00
Stewart's Patent ..... ₱ doz. $10.00

Clips, Axle—

Eagle and Superior ¼ and 5-16 inch ..... 70@10%
Norway, ¼ and 5-16 inch .. 70@70@10%

Cloth and Netting, Wire—See *Wire, &c.*

Cocks, Brass—

Hardware' list:
Compression and Plain Bibbs ..... 65@5@65@10%
Globe, Kerosene, Racking, &c., Cocks ..... 65@10@70%

Coffee Mills—See *Mills, Coffee.*

Collars Dog—

Brass, Pope & Stevens' list 40%
Embossed, Gilt, Pope & Stevens' list 30&10%
Leather Pope & Stevens' list 40%

Combs, Mane and Tail—

Covert's Saddlery Works ..... 60&10%

Compasses Dividers, &c.

Ordinary Goods ..... 75@75@5%
Bemis & Call Hdw. & Tool Co.:
Dividers 65%
Calipers, Call's Patent Inside 55%
Calipers, Double 65%
Calipers, Inside or Outside 65%
Calipers, Wing 60%
Compasses 50%
J. Stevens A. & T. Co ..... 25&10%

Compressors, Corn Shock—

J. B. Hughes' ₱ doz $2.50

Conductor Pipe, Galva.—

L. C. L. to Dealers:

Territory.	Not nested.	Nested.
Eastern	70c&2½c&10%	70c&5c&10%
Central	65c&10c&10%	70c&10%
Southern	65c&10%	65c&2½c&10%
S. Western	60c&12½c&10%	60c&15c&10%

Terms, 2% for cash.
Jobbers receive extra 12½&2½ on carloads loose, and extra 12½ on carloads crated.
See also *Eave Troughs.*

Coolers, Water—

Gal, each.	2	3	4	6	8
Labrador	$1.20	$1.50	$1.80	$2.10	2.20
Gal.	3	4	5	6	8
Iceland, ea.	$1.80	$2.10	$2.40	$3.00	
Gal.,	2	3	4	6	8
Galv. Lined Ea.	$1.85	$2.00	$2.25	$2.90	$3.90

25%

Ga.v. Lined side handles

Gal.	2	3	4	5	3
Each.	$1.95	$2.15	$2.40	$3.30	$4.15..25%

Coopers' Tools—

See *Tools, Coopers'.*

Cord— Sash—

Braided, Drab ..... lb. 25c
Braided, White, Com .... lb. 17½@18c
Cable Laid Italian ..lb. A, 18c; B, 16c
Common India ..... lb 9 @9½c
Cotton Sash Cord, Twisted ....12@16c
Patent Russia ..... lb. 12¼@13c
Cable Laid Russia ..... lb. 13½@14c
India Hemp, Braided ..... lb 14@15c
India Hemp, Twisted ..... lb. 10@12c
Patent India, Twisted ..... lb.10@12c
Pearl Braided, cotton ..... ₱ lb 18c
Massachusetts, White ..... ₱ lb 22½c
Massachusetts, Drab ..... ₱ lb 26½c
Eddystone Braided Cotton ..... ₱ lb 19c
Harmony Cable Laid Italian ..... ₱ lb 18c
Oswawan Mills:
Crown, Solid Braided White ... ₱ lb 22c
Braided, Giant, White ..... ₱ lb 20c
Peerless:
Cable Laid Italian 16c
Cable Laid Russian 14c
Cable Laid India 12c
Braided India 18c
Phœnix, White 19c
Samson, Nos. 7 to 12:
Braided, Drab Cotton ..... ₱ lb 32½c
Braided, Italian Hemp ..... ₱ lb 32½c
Braided, Linen ..... ₱ lb 40c
Braided, White Cotton, Spot ₱ lb 28½c
No. 6 cords, 1¢ extra.
Silver Lake:
A quality, Drab, 40¢ 15%
A quality, White, 35¢ 15%
B quality, Drab, 35¢ 15%
B quality, White, 30¢ 15%
Italian Hemp, 40¢ 15%
Linen, 57½¢ 15%

Wire Pictures—

List Oct., '00, 85c&10c&10@85c&10c&10c&10%
Note.—There is a good deal of confusion in lists, some using old list and others the above list.

Corn Knives and Cutters—See *Knives, Corn.*

Corn Planters—

See *Planters. Corn—*

Crackers, Nut—

Little Giant, ... ₱ gr. $34.00

Cradles—

Grain 50%

Crayons—

White Round Crayons, gross .5½@6c
Cases, 100 gro., $4.50, at factory.
D. M. Steward Mfg. Co.
Metal Workers' Crayons, gr. $2.50
Soapstone Pencils, round, flat or square ..... gr. $1.50
Rolling Mill Crayons ..... gr. $2.50
Railroad Crayons (composition) gr. $2.00
Case lots 20%
See also *Chalk.*

Creamery Pails—See *Pails, Creamery.*

Crooks, Shepherds'—

Fort Madison, Heavy ..... ₱ doz. $7.00
Fort Madison, Light ..... ₱ doz. $6.50

Crow Bars—See *Bars, Crow.*

Cultivators—

Victor Garden ..... ₱ doz. $10.00

Cutlery Table—

International Silver Company:
No. 12 Medium Knives, 1847.. ₱ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor ..... ₱ doz. $3.00
Wm. Rogers & Son ..... ₱ doz. $2 50
Simeon L. & Geo. H. Rogers Company:
12 dwt. Medium Knives ..... ₱ doz. $3.00
No. 77 Medium Knives ..... ₱ doz. $2.50

Cutters— Glass—

H. H. Mayhew Co 40%
Smith & Hemingway Co 50%

Meat—

Hale's..Nos. 11 & 111 12 & 112 13 & 113
Per doz .. $9.50 12.50 16.00
American 30%

Nos.	1	2	3	4	5
Each	$5	$7	$10	$25	$50

$60

Connecticut 50%

Nos.	20	40	60	8	10	12
Each	$1.75	2.00	2.25	3.00	3.00	4.00

Enterprise ..... 25@25&7½%

Nos.	5	10	12	22	32
Each	$2	$3	$2.50	$4	$6

Dixon's, ₱ doz. ..... 30&10@40%

Nos.	1	2	3	4
	$14.00	$17.00	$19.00	$30.00

Home No. 1, ₱ doz. $22.75 ..... 50&10%
Little Giant, ₱ doz. ..... 33⅓&5@40%

Nos.	305	310	312	320	322
	$35.00	$48.00	$44.00	$72.00	$68.00

Sterling ..... 33⅓&5%

Nos	1	2
Each	$2.00	$2.50

New Triumph No. 605, ₱ doz. $24.00 ..... 30&10@40%
Woodruff's, ₱ doz ..... 30&10@40%

Nos	100	150
	$15.00	$18.00

Chadborn's Smoked Beef Cutter, ₱ doz. $60.00
Enterprise Beef Shavers ..... 35@30%

Slaw and Kraut—

Henry Disston & Sons:
Slaw, Corn Grater, &c 40%
Kraut Cutters 24 x 7, 26 x 8, 30 x 9 .. 55%
Kraut Cutters 36 x 12, 40 x 12 ..... 40%
Tucker & Dorsey Mfg. Co.:
Kraut Cutters 40%
Slaw Cutters, 1 Knife, ₱ gr. ... $18@$20
Slaw Cutters, 2 Knife, ₱ gr. ... $22@$36

Tobacco—

All Iron, Cheap ..... *doz. $4.25@$4.50*
Enterprise ..... 25@50%
National, ₱ doz. $21.00 ..... 40%
Sargent's, ₱ doz., No. 2 ..... 60%
Sargent's No 12 and 21 ..... 60&10%

Washer—

Appleton's, ₱ doz. $16.00 ..... 50&10%
Bonney's 40%

Diggers, Post Hole, &c.—

Dalbey Post Hole Auger...per doz., $9.00
Iwan's Improved Post Hole Auger 40%
Iwan's Perfection Post Hole Digger ... ₱ doz. $9.00
Kohler's Universal ..... ₱ doz, $14.00
Kohler's Little Giant ..... ₱ doz. $14.00
Kohler's Hercules ..... ₱ doz. $12.00
Kohler's Invincible ..... ₱ doz. $10.00
Kohler's Rival ..... ₱ doz. $9.00
Kohler's Pioneer ..... ₱ doz. $9.00
Never-Break Post Hole Diggers, ₱ doz. $24.00 ..... 60%
Samson, ₱ doz. $34.00 ..... 25%

Dividers—See *Compasses.*

Dog Collars—See *Collars, Dog.*

Door Checks—

See *Checks, Door.*

Door Springs—

See *Springs, Door.*

Doors, Screen—

Porter's Plain, No. 6 ..... ₱ doz. $6 50
Porter's Ornamental, No. 70. ₱ doz. $10.00

Drawers, Money—

Tucker's Pat. Alarm Till No. 1, ₱ doz. $18; No. 2, $15; No. 3, $12; No. 4, $18.

Drawing Knives—

See *Knives, Drawing.*

Drills and Drill Stocks—

Common Blacksmiths' Drill..each $1.50@$1.75
Blacksmiths' Self-feeding ..... each $3.75@4.00
Breast, Millers Falls ..... 15&10%
Breast, P., S. & W ..... 40&5%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills Nos. 2 and 3 ..... 16⅔&10%
Johnson's Drill Points ..... 16⅔&5&10%
Millers Falls Automatic Drills ... 33⅓&10%
Ratchet, Curtis & Curtis 25%
Ratchet, Parker's 40%
Ratchet, Weston's ..... 20@25%
Ratchet, Whitney's, P.S. & W 50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00 ..... 33⅓%

Twist Drills—

Standard List .... 60c10@60c10c10%

Drill Bits or Bit Stock Drills—See *Augers and Bits.*

Drill Chucks—See *Chucks.*

Dripping Pans—

See *Pans, Dripping.*

Drivers, Screw—

Screw Driver Bits ...per doz. 45@70c
Balsey's Screw Holder and Driver, ₱ doz. 2-inch, $6; 4-in., $7.50 6-in., $9 ..40%
Buck Bros. ..... -30%
Buck Bros' Screw Driver Bits 30%
Champion 50%
Fray's Rol. H'dle Sets, No. 3, $12.00 50%
Gay's Double Action Ratchet 35%
Goodell's Automatic ..... 50&10&10@50&10&10&5%
Mayhew's Black Handle 50%
Mayhew's Monarch ..... 40&10%
Millers Falls, Nos. 20 and 21 ..... 25&10%
Millers Falls, Nos. 11, 12, 41, 42 ..... 15&10%
New England Specialty Co ..... 50&10%
Sargent & Co.'s:
Nos. 1, 50, 55 and 60 ..... 60%
Nos. 20 and 40 ..... 70%
Smith & Hemenway Co ..... 40&5%
Stanley's R. & L. Co.'s:
No. 64, Varnished Handles 70&70&10&10%
No. 85 ..... 70@70&10&10%
Swan's:
Nos. 65 to 68 ..... 50%
No. 40 ..... 40&10%
Nos. 25, 35 and 45 ..... 20&10&10%

Eave Trough Galvanized

Territory.	L. C. L.	
Eastern	75c&c10@10%	Carloads extra 12½&%
Central	75c&7½&c10%	
Southern	70c&7½&c10%	
S. Western	70c&10c&10%	

Terms, 2% for cash.
See also *Conductor Pipe and Elbows.*

Egg Beaters—See *Beaters, Egg*

Openers—

See *Openers. Egg.*

Elbows and Shoes—

Factory shipments 60%
Perfect Elbows (S. S. & Co.) 30%

Emery, Turkish—

	4 to 6	5 to 15	Flour
Kegs ..... lb.	5c	5½c	3½c
½ Kegs ..... lb.	5½c	5¾c	3¾c
Kegs ..... lb	5c	6c	
10-lb cans. 10 in case	6½c	7c	6c
10-lb. cans. less than 10.	10c	10c	8c

NOTE.—*In lots 1 to 3 tons a discount of 10% is given.*

Enameled and Tinned Ware—See *Ware, Hollow.*

Escutcheon Pins—

See *Pins, Escutcheon.*

Extractors, Lemon Juice—See *Squeezers, Lemon.*

Fasteners, Blind—

Zimmerman's ..... 50&10%

Faucets—

Cork Lined ..... 70c5@70c10c5%
Metallic Key, Leather Lined ..... 70@70c10%
Red Cedar ..... 50@50c10%
B. & L. B. Co.:
Lockport, Metal Plug, reduced list 60&5%
Star ..... 60@60&5%
Star, Metal Plug new list ..... 40@40&5%
West's Lock, Open and Shut Key 50&10%
John Sommer's Peerless Tin Key 40%
John Sommer's Boss Tin Key 50%
John Sommer's Victor Metal Key. 50&10%
John Sommer's Duplex Metal Key 60%
John Sommer's Diamond Lock 40%
John Sommer's I. X. L. Cork Lined .. 50%
John Sommer's Reliable Cork Lined ..... 50&10%
John Sommer's Chicago Cork Lined .. 60%
John Sommer's O. K. Cork Lined 50%
John Sommer's No Brand, Cedar 50%
John Sommer's Perfection Cedar 40%
McKenna, Brass:
Burglar Proof, N. P 35%
Improved, ¾ and ⅞ inch 35%
Self Measuring:
Enterprise, ₱ doz. $30.00 ..... 40&10%
Lane's, ₱ doz. $36.00 ..... 40&10%
National Measuring, ₱ doz. $36.00... 40%

Felloe Plates—

See *Plates, Felloe.*

Files—Domestic—

List revised Nov. 1, 1899.

Best Brands	70c	5@70c	10c		
Standard Brands	75@75c	10c	5%		
Second Quality	75c	10c	10@80c	5%	

Imported—

Stubs' Tapers, Stubs' list, July 24, '97 ..... 35%

Fixtures, Grindstone—

Net Prices:

Inch	15	17	19	21	24
Per doz	$2.60	2.75	3.00	3 50	4.40

P., S. & W. Co ..... 30&10@40%
Reading Hardware Co 60%
Sargent's ..... 60&10&10%
Stowell's Giant Grindstone Hanger, ₱ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy ..... 50&10&10%
Stowell's Grindstone Fixtures Light ..... 60&10%

Fodder Squeezers—

See *Compressors.*

Forks—

Sept. 1. 1900, list.
Grain or Barley Forks, 16 to 20 inches ..... 70c6% (Extra 10c5@30%)
Hay, 2 tine 65%
Hay, 3 tine 66⅔%
Hay, 4 tine. Header and Barley Forks, 13 to 16 inches 66⅔%
Manure, 4 tine 70%
Manure, 5 and 6 tine 70%
Spading 70c5%
Iowa Dig-Eay Potato 65%
Victor, Hay 66⅔%
Victor, Manure 70%
Victor, Header ..... 60&30%
Champion, Hay 66⅔%
Champion, Manure 70%
Columbia, Hay ..... 66⅔&5%
Columbia, Manure 70%
Columbia, Spading 70%
Hawkeye Wood Barley 4 tine ₱ doz. $5.00; 6 tine, $6.00.
W. & C. Potato Digger 65%
Acme Hay ..... 60&10&7½%
Acme Manure, 4 tine ..... 60&20&10%
Acme Manure, 6 tine ..... 66⅔&10&2%
Dakota Header ..... 65&15&5%
Jackson Steel Barley ..... 65&15&5%
Kansas Header 66⅔%
W. & C. Favorite Wood Barley 4 tine, ₱ doz., $5.00; 6 tine, $6.00
Plated.—See *Spoons.*

Frames— Saw—

Red, Polished and Varnished..doz. $1.15@$1.35
White ..... *doz. 75@80c*

Screens and Frames—

See *Screens.*

Freezers Ice Cream—

Qts...	2	3	4	6	8	10
Best	$1.45	1.65	1.95	2.40	3.20	4.20
Good	$1 25	1.40	1.70	2.15	2.75	3.75
Fair	$1.00	1.10	1.30	1.75	2.30	2.90

Fruit and Jelly Presses—

See *Presses, Fruit and Jelly.*

Fry Pans—See *Pans, Fry.*

Fuse— *Per 1000 Feet.*

Hemp Fuse $2.60
Cotton Fuse 2.90
Single Taped Fuse 3.25
Double Taped Fuse 4.50
Triple Taped Fuse 5.00
(Extra 10c&5%)

Gates, Molasses and Oil—
Stebbins' ..... 30&10@10%

Gauges—
Marking, Mortise, &c. ..... 55&10@55&10&10%
Chapin-Stephens Co., Gauges ..... 50&10@50&10&10%
Fulton's Butt Gauge ..... 30&10%
Stanley R. & L. Co.'s Butt & Babbet Gauge ..... 20@20&10&10%
Wire, Brown & Sharpe's 25%
Wire, Morse's 25%
Wire P., S. & W. Co ..... 30&10%

Gimlets— Single Cut—
Nail, Metal, Assorted, gro. $1.50@1.60
Spike, Metal, Assorted gro. $2.80@3.25
Nail, Wood Handled, Assorted, gro. $1.75@2.00
Spike, Wood Handled, Assorted gro. $3.25@3.50

Glass, American Window
Jobbers' List, Jan. 21, 1901.
From store, Single and Double 89%
F. O. B. factory, carload lots:
Single and Double strength ..90&5%

Glasses Leve —
Chapin-Stephens Co., ... 60@60&10&10%

Glue—Liquid, Fish—
List A, Bottles or Cans, with Brush.
List B, Cans (½ pts., pts., qts) 33 3&48%
List C, Cans (½ gal., gal.) ....25@45%
International Glue Co. (Martin's) ..... 40&10@5%

Glue Pots—See *Pots, Glue.*

Grease, Axle—
Common Grade ..... *gro.* $5.00@6.00
Dixon's Everlasting ....10-lb pails, ea. 85¢
Dixon's Everlasting, in boxes, ₱ doz. 1.05 $1.20; 2 lb $2.00
Snow Flake:
1 qt. cans per doz. $2.00; 2 qt., $3.20; 1 gal. cans per doz. $6.00; 3 gal. $16.00; 5 gal. $24.00

Grindstones—
Bicycle Grinder, each $6.50
Bicycle Grindstones, each ..... $2.50@5.00
Pike Mfg. Co:
Improved Family Grindstones, per inch, per doz. $2.00
Pike Mowe Knife and Tool Grinder, each $6.00
Velox Ball Bearing, mounted, Angle Iron Frames ..... each, $3.25

Guards, Snow—
Cleveland Wire Spring Co.:
Galv. Steel ₱ 1000 ..... $9.00
Copper ₱ 1000 ..... $18.00

Gun Powder—See *Powder.*

Hack Saws—See *Saws.*

Hafts, Awl—
gro.
Peg Paveul, Leather Top ..$4.50@5.25
Peg Paveul, Plain Top ....$3.50@4.25
Sewing, Brass Ferrule ....$1.50@1.60
Saddlers', Brass Ferrule ..$1.35@1.50
Peg, Common ..... $1.25@1.35
Brad, Common ..... $1.50@1.75

Halters and Ties—
Covert Mfg. Co.:
Web ..... 45&2%
Jute Rope ..... 45&2%
Sisal Rope ..... 30&5%
Covert's Saddlery Works:
Web and Leather Halters 70%
Jute and Manila Rope Halters 70%
Sisal Rope Halters ..... 65&20%
Jute, Manila and Cotton Rope Ties 70%
Sisal Rope Ties ..... 60&10%

Hammers—
Handled Hammers—
Heller's Machinists' ..... 50@50&5%
Heller's Carriers ..... 50@50&5%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75 ..... 40@40&10&10%
Peck, Stow & Wilcox 50%
Fayetteville Plumb:
Plumb, A. E. Nail ..... 33⅓&3@33⅓&10&5%
Engineers' and B. S. Hand ..... 50&10&7½@50&10&10&7½%
Machinists' Hammers ..... 50&10@50&10&10%
Riveting and Tinners' ..... 40&7½@40&10&7½%
Sargent's C. S. New List 40%

Heavy Hammers and Sledges—
2 lb. and under ..... *lb.* 4.5¢ } 75&5@75
3 to 5 lb ..... *lb.* 3.6¢ } &1%
Over 5 lb ..... *lb.* 3.6¢ }
Wilkinson's Smiths' ..... 9½¢@10¢ lb.

Handcuffs and Leg Irons
See *Police Goods*

Handles—
Agricultural Tool Handles—
Axe, Pick &c. ..... 60&5&10&5%
Hoe, Rake, Fork &c. ..... 60@60&5%
Shovel, &c., Wood D Handle ..... 50&5 @ 0%

Cross-Cut Saw Handles—
Atkins' ..... 40&5%
Champion ..... 45@45&10%
Disston 50%

Mechanics' Tool Handles—
Auger, Assorted ..... *gro* $2.30@2.70
Brad Awl ..... *gro.* $1.35@1.50
Chisel Handles:
Apple Tanged Firmer, gro ass'd, $2.25@2.35; large, $2.50@2.60
Hickory Tanged Firmer, gro. ass'd $1.75@2.20; large, $3.50@3.70.
Apple Socket Firmer, gro ass'd, $1.70@1.85; large, $2.00@2.25
Hickory Socket Firmer, gro ass'd, $1.60 @ $1.75; large, $1.75 @ $2.00
Hickory Socket Framing, gro. ass'd, $2.50@2.75; large, $2.65@2.85
Wile, assorted ..... *gro.* $1.00@1.15
Hammer, Hatchet, Axe, &c. 60%
Hand Saw, Varnished, doz. 70@75c
Not Varnished ..... 55@60c
Plane Handles:
Jack, doz. 25c; Jack Bolted ..55@60c
Fore, doz. 35@38c; Fore, Bolted .. 70@75c
Chapin-Stephens Co.:
Carving Tool ..... 40@4&10&10%
Chisel ..... 65@65&10%
File and Awl ..... 65@65&10%
Saw ..... 40@40&10&10%
Screw Driver ..... 40@40&10&10%
Millers Falls Adj. and Ratchet Auger Handles ..... 15&10%
Nicholson Simplicity File Handle, ₱ gro. ..... $0.35@$1.50

Hangers—
Barn Door, New Pattern, Round Groove, Regular:

Inch	*3*	*4*	*5*	*6*	*8*
Doz	$0.85	1.20	1.50	1.90	2.30

Barn Door, New England Pattern, Check Back, Regular:

Inch	*3*	*4*	*5*	*6*
Doz	$1.30	1.75	2.50	3.00

Chicago Spring Butt Co.: 25%
Friction 25%
Ouel Plating 25%
Big Twin 25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door 50%
Elevator 40%
Railroad 55%
Cronk Hanger Co.: 60%
Loose Axle ..... 60&10%
Roller Bearing ..... 60&10%
Lane Bros. Co.:
Parlor, Ball Bearing $4.15
Parlor, Standard $3.35
Parlor, New Model $2.85
Parlor New Champion $2.25
Barn Door, Standard ..... 50&10&10&5%
Covered ..... 50&10&10%
Sliding ..... 50&10&10&5%
Lawrence Bros.: 60%
Advance 70%
Cleveland 60%
Crown 60%
New York 60%
Peerless ..... 60&10%
Sterling 60%
McKinney Mfg. Co.:
No. 1, Special, $15 ..... 60&10%
No. 2, Standard, $18 ..... 60&10%
Myers' Stayon Hangers and Tracks ..... 50&10&10% (net)
Stowell Mfg. and Foundry Co.
Acme Parlor Ball Bearing 40%
Atlas 60%
Butler Barn Door 50%
Baggage Car Door 50%
Climax Anti-friction 50%
Elevator 40%
Express 50%
Interstate 40%
Lundy Parlor Door 50%
Matchless 50%
Nu Sco ..... 60&10%
Railroad 50%
Street Car Door 50%
Steel, Nos. 00, 400, 500 ..... 40&10%
Stowell Parlor Door 50%
Wilcox, Nos. 0, 00, 400, 500 ..... 5%
Zenith for Wood Track 50%
Taylor & Boggis Foundry Co.:
Kidder's ..... 50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing ..... 60&10%
C. L. Roller Bearing ..... 60&10%
Cycle Ball Bearing 50%
Dwarf Ball Bearing 40%
Ives, Wood Track ..... 60&10%
L. P. Roller Bearing ..... 60&10&5%
New Era Roller Bearing ..... 50&10%
O. K. Roller Bearing ..... 60&10&5%
Pindle, Wood Track 60%
Richards' Wood Track 60%
Richards' Steel Track ..... 50&10%
Spencer Roller Bearing ..... 60&10%
Tandem Nos. 1 and 2 ..... 60%
Underwriters' Roller Bearing 40%
Velvet 50%
Wilcox Auditorium Ball Bearing 50%
Wilcox Barn Trolley No. 123 ..... 40%
Wilcox Elevator Door Hangers, Nos 112 and 122½ 5%
Wilcox Elevator Door Hangers, No. 142 ..... 40%
Wilcox Fire Trolley, Roller Bearing 30%
Wilcox Le Roy Noiseless Ball Bearing 40%
Wilcox New Century ..... 50&10&10%
Wilcox O. K. Steel Track 50%
Wilcox O. K. Trolley 50%
Wilcox Trolley Ball Bearing 40%
Wilcox Wideman Narrow Gauge Ball Bearing 40%

Harness Menders—See *Menders.*

Harness Snaps—See *Snaps.*

Hasps—
McKinney's Perfect Hasp ₱ doz 50%
Wrought Hasps, Staples, &c.—See *Wrought Goods.*

Hatchets—
Best Brands ..... 50@50&10%
Cheaper Brands ..... 50@60&10%
Note.—Net prices often made.

Hay and Straw Knives—
See *Knives.*

Hinges—
Blind and Shutter Hinges—
Surface Gravity Locking Blind:
(Victor; National; 1888 O. P. Niagara; Clark's O. P.; Clark Tip; Buffalo.)

No	*1*	*3*	*5*
Doz pair	$0.75	1.45	2.90

Mortise Shutter:
(L. & P., O. S., Dixie, &c.)

No	*1*	*1½*	*2*	*2½*
Doz pair	$0.60	.55	.52	.55

Mortise Reversible Shutter, (Buffalo, &c.)

No	*1*	*1½*	*2*
Doz pair	$0.65	.60	.55

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50 ..... 10%
Parker ..... 70&75%
Reading's Gravity ..... 75&10%
Sargent's, Nos. 1, 3, 5, 11 & 13 ..... 70&10&20%
Stanley's Steel Gravity Blind Hinges, ₱ doz. sets, without screws, $0.80; with screws, $1.15.
Wrightsville H'dware Co.:
O. S. Lull & Porter ..... 80&2½%
Acme, Lull & Porter ..... 75&10%
Queen City Reversible ..... 75&10%
Stenger's Positive Locking, Nos. 1 & 3 ..... 70&10&5%
Shepard's Noiseless, Nos. 60, 65, 55 ..... 70&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5 ..... 75&7½%
1888, Old Pat'n, Nos. 1, 3 & 5 ..... 75&7½%
Tip Pat'n, Nos. 1, 3 & 5 ..... 75&7½%
Buffalo Gravity Locking, Nos. 1, 3 & 5 ..... 75&7½%
Shepard's Double Locking, Nos. 20 & 27 ..... 70&10%
Champion Gravity Locking, No. 75 ..... 75&7½%
Steamboat Gravity Locking, No. 10 ..... 75&7½%
Pioneer, Nos. 060, 45 & 5½ ..... 75&7½%
Empire, Nos. 101 & 103 ..... 70&7½%
W. H. Co.'s Mortise Gravity Locking, No. 2 ..... 60&10%

Extra 5 & 10% often given.

Gate Hinges—
Clark's or Shepard's—Doz. sets:

No	*1*	*3*	*5*
Hinges with Latches	$1.80	1.90	2.65
Hinges only	$1.20	1.40	2.00
Latches only	.60	.60	.65

New England:
With Latch ..... *doz* ....@$1.55
Without Latch ..... *doz.* ....@$1.25
Reversible Self-Closing:
With Latch ..... *doz.* ....@$1.80
Without Latch ..... *doz.* ....@$1.45
Western:
With Latch ..... *doz.* $1.50@1.75
Without Latch ..... *doz.* $0.95@1.20
Wrightsville Hdware Co.:
Shepard's or Clark's, doz. sets,

No.	1	2	3
Hinges with Latches	$1.80	2.00	2.75
Hinges only	1.30	1.50	2.10
Latches only	.65	.65	.70

Spring Hinges—
Holdback, Cast Iron, gro. $8.00@8.50
Non-Holdback, Cast Iron gro $7@7.50
J. Bardsley
Bardsley's Patent Checking 15%
Bommer Bros.:
Bommer Ball Bring Floor Hinges 40%
Bommer Spring Hinges 40%
Chicago Spring Butt Co.:
Chicago 25%
Floor Hinge 50%
Garden City Engine House 25%
Keen's Saloon Door 25%
Triple End 50%
Columbian Hdw. Co.:
Acme, Wrt. Steel 30%
Acme, Brass ..... 20&5%
American 30%
Columbia, No. 14 ..... ₱ gr. $9.00
Columbia, No. 18 ..... ₱ gr. $25.00
Columbia, Adjustable, No. 7 ₱ gr. $12.00
Gem new list 30%
Clover Leaf ..... ₱ gr. $12.50
Oxford new list 30%
Hoffman Hinge & Foundery Co.:
No. 70 & 80 Holdback Detachable $8.50
Lawson Mfg. Co.:
Matchless 35%
Matchless Pivot 45%
Payson Mfg. Co.:
Oblique ..... 50&10%
Shelby Spring Hinge Co.:
Crown Jamb Hinge 40%
Chief Ball Bearing Floor Hinge 45%
Royal Ball Bearing Floor Hinge 45%
Stover Mfg. Co.:
Ideal, No. 10, Detachable, ₱ gr $12.50
Ideal, No. 4 ..... ₱ gr. $9.00
New Idea No. 1 ..... ₱ gr. $9.00
New Idea, Double Action 15%

Extra 10% often given on most of these Hinges.

Wrought Iron Hinges—
Strap and T Hinges, &c., list Mar. 15, 1901:
Light Strap Hinges 70%
Heavy Strap Hinges ..... 75&10%
Light T Hinges ..... 60&5%
Heavy T Hinges ..... 60&5%
Extra Heavy T Hinges 55%
Hinge Hasps 55%
Cor. Heavy Strap ..... 75&10%
Cor. Ex. Heavy T 75%
Screw Hook and Strap: *6 to 12 in.* ..... *lb* 3¼¢; *14 to 20 in* ..... *lb.* 3 ¢; *22 to 36 in* ..... *lb.* 2¾¢
Screw Hook and Eye:
¾ to 1 inch ..... *lb* 5 ¢
⅝-inch ..... *lb* 6 ¢
½-inch ..... *lb.* 7 ¢

Extra 25% & 25&5%

Miscellaneous—
Hoffman's Steel Spring Butt Hinges ..... 40&10%
Hoffman's Offset Refrigerator Hinges ..... 40&10%

Hods, Coal—

	15	*16*	*17*	*18 inch.*
Galv. Open	$2.70	3.00	3.30	3.60 ₱ doz.
Jap. Open	$2.10	2.50	2.70	3.00 ₱ doz.
Galv. Funnel	$3.30	3.60	3.90	4.20 ₱ doz.
Jap. Funnel	$2.70	3.00	3.30	3.60 ₱ doz.

Hoes— Eye—
Scovil and Oval Pattern ..... 60&5%@60&10&5%
Grub, list Feb. 23, 1899 .... 70@70&10%
D. & H. Scovil 35%

Handled—
Sept. 1, 1900, List:
Field and Garden ..... 75&2%
Ladies', Boys', Toy and Onion ..... 70&10&10%
Street and Mortar ..... 75&7½&2%
Cotton ..... 70&10&10&5&2%
Planters' ..... 70&30%
Weeding 75%
Note.—Manufacturers and jobbers use a diversity of lists, and often sell at net prices.
Ft. Madison Crucible Garden Hoe 75&2%
Ft. Madison Crescent Cultivator Hoe, per doz ..... 75&10&2%
Ft. Madison Mattock Hoes:
Regular Weight ..... ₱ doz. $4.50
Junior Size ..... ₱ doz. $4.00
Ft. Madison Sprouting Hoe, ₱ doz. $4.80
Ft. Madison Dixie Tobacco Hoe. 75&20%
Kretsinger's Cut Easy, per doz .... 75&2%
Warren Hoe 60%
W. & C. Ivanhoe ..... 75&2%
B. B. Cultivator Hoe ..... 75&10&2%
Acme Weeding ..... 75&10&2%
W. & C. Lightning Shuffle Hoe, ₱ doz. $4.85

Hog Rings and Ringers—
See *Rings and Ringers*

Hoisting Apparatus—
See *Machines, Hoisting.*

Hollow Ware—
See *Ware, Hollow.*

Holders— Bit—
Angular, ₱ doz. $3.00 ..... 45&10%

Door—
Empire 50%

File and Tool—
Nicholson File Holders and File Handles 33⅓%

Hooks— Cast Iron—
Bird Cage, Reading 60%
Bird Cage, Sargent's List 60%
Ceiling, Sargent's List ..... 40&10%
Clothes Line, Hoffman's ..... 40&10%
Clothes Line, Reading List ..... 65&10@65&10&10%
Clothes Line, Sargent's List ..50&20&10%
Coat and Hat, Sargent's List ....45&10%
Clothes Line, Stowell's 70%
Coat and Hat, Stowell's 70%
Coat and Hat, Reading ..... 70@75%
Coat and Hat, Wrightsville ..... 65&10%
Harness, Reading List ..... 70&10@75%

Wire—
Belt 80%
Wire C. & H. Hooks ..60@10@60@10@5%
Atlas, Coat and Hat:
Single Cases 50%
10 Case Lots ..... 50&10%
Czar Harness ..... 50&10&5%
Wire Coat and Hat:
Acme 60%
B. B. 60%
V Brace, Chief and Czar 60%
Gem 60%
Bright Wire Goods—See *Wire.*

Wrought Iron—
Box, 6 in., per doz. $1.50; 8 in., $1.75; 10 in., $2.00.
Cotton ..... *doz.* $1.05@1.25
Wrought Staples, Hooks, &c.—See *Wrought Goods.*

Miscellaneous—
Bush, Light, doz. $5.50; Medium, $6.00; Heavy, $6.50
Grass ..... *Nos.* 1 2 3 4
Best $1.50 1.75 2.00
Common $1.30 1.30 1.40 1.60
Potato and Manure 70%
Whiffletrees ..... *lb.* 4¾¢
Hooks and Eyes:
Brass ..... 60¢10¢10¢10¢70%
Malleable Iron ..... 70&50&70&10%
Covert Saddlery Works' Self Locking Gate and Door Hook 60%
Crown Picture ..... 50&10%
Bench Hooks—See *Bench Stops.*
Corn Hooks—See *Knives, Corn.*

Horse Nails—See *Nails, Horse*

Horseshoes—
See *Shoes, Horse.*

Hose, Rubber—
Garden Hose, ¾-inch:
Competition ..... *ft.* 4¾@ 4¾¢
3-ply Standard ..... *ft.* 5 @ 6 ¢
4-ply Standard ..... *ft.* 8 @ 9 ¢
5-ply extra ..... *ft.* 9 @10 ¢
4-ply extra ..... *ft.* 11 @12 ¢
Cotton Garden, ¾-in., coupled:
Low Grade ..... *ft.* 6 @7 ¢
Fair quality ..... *ft.* 8 @9 ¢

Irons— Sad—
From 4 to 10 ..... *lb* 2¾@3¢
B. B. Sad Irons ..... *lb.* 3¼@3¾¢
Chinese Laundry ..... *lb.* 5¢@5¾¢
Chinese Sad ..... *lb.* 3¼@3½¢
Mrs. Potts', per set:

Nos.	*50*	*55*	*60*	*65*
	65&70¢	60@65¢	75@80¢	70@75¢

New England Pressing, lb. .. 3¼@3½¢

Soldering—
Soldering Copper ....18@19
2 lb., and up ....20@21¢
Covert Mfg. Co. ..... 20&2%
Smith & Hemenway Co's Sets 70%

Pinking—
Pinking Irons ..... *doz.* 50@60¢

Jack Screws—See *Screws.*

Jacks, Wagon—
Covert Mfg. Co., Steel ..... 45&2%
Covert's Saddlery Works':
Daisy ..... 60&10%
Vict'r ..... 60&10%
Lockport ..... 40&40&10%
Lane's Steel ..... 30&10%

Kettles—
Brass, Spun, Plain ....20@25%
Enameled and Cast Iron—See *Ware, Hollow.*

Knife Sharpeners—
See *Sharpeners, Knife.*

Knives—
Butcher, Shoe, &c.—
Foster Bros.' Butcher, &c. 30%
Hartzell Cutlery Co. ..... 30&5%
Smith & Hemenway Co ..... 40&10%
Hay and Straw—See *Hay Knives.*

Corn—
Ft. Madison Cut-Easy, ₱ doz $3.25
Withington Acme, ₱ doz., $2.65; Dent, $2.75; Ad. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.

Drawing—
Standard List ..... 70&5@70&10%
Adjustable Handle 25%
Bradley's 35%
C. E. Jennings & Co. Nos. 45, 46 ..... 60&10%
Jennings & Griffin, Nos. 51, 52, 60 ..... 60&10%
Swan's ..... 70&10&2½%
Watrous ..... 10&5&10%
L. & I. J. White ..... 20&5@25%

Hay and Straw—
Lightning ..... *per doz* $5.00@5.25
Iwan's Sickle Edge ..... ₱ doz. $1.60
Iwan's Serrated ..... ₱ doz., $11.00
Maine ..... ₱ doz. $8.50

Mincing—
Buffalo ..... ₱ gro. $15.00

Miscellaneous—
Farriers' ..... *doz.* $2.00@3.00
Wossenhoim's ..... ₱ doz. $3.00@3.25

Knobs—
Base, 2½-inch, Birch, or Maple, Rubber tip, gro ..... $1.10@1.20
Carriage, Jap. all sizes ..*gro.* 30@33¢
Door, Mineral ..... *doz.* 60@65¢
Door, Por. Jap'd ..... *doz.* 65@70¢
Door, Por. Nickel ....*doz.* $2.00@2.10
Bardsley's Wood Door, Shutter, &c .. 15%
Picture, Sargent's ..... 60&10%

Lacing Leather—
See *Belting Leather.*

Ladders, Step Etc.—
Goshen Mfg. Co.'s Step, etc. 50%
Lane's Store 25%

Myers 'Noiseless Store Ladd...

Ladles— Melting—
L. & G. Mfg. Co. 25%
P. S. & W. 5%
Reading 6%
Sargent's ..... 45&10%

Lanterns— Tubular—
Regular Tubular ..... doz. $4.35@4.75
Lift Tubular ..... doz. $4.75@5.25
Hinge Tubular ..... doz. $4.75@5.25
Other Styles ..... 40c 10@40c 10d 5%

Bull's Eye Police—
No. 1, 2¾ inch ..... $2.50@2.75
No. 2, 3 inch ..... $2.70@3.00

Latches, Thumb—
Roggin's Latches ..... doz. 30@33c

Lawn Mowers—
See *Mowers, Lawn.*

Leaders Cattle—
Small ..... doz. 55c; large, 60c
Covert Mfg. Co. ..... 45&2%

Lemon Squeezers—
See *Squeezers, Lemon.*

Lifters, Transom—
Solid Grip, Payson Mfg. Co. 80%
K & E. 33⅓%

Lines—

	18	19	20
Wire Clothes, Nos...			
100 feet	$2.20	2.00	1.65
75 feet	$1.80	1.70	1.30

Ossawan Mills.
Crown Solid Braided Chalk 33⅓%
Mason's, No. 0 to No. 5 ..... 33⅓%
Samson Cordage Works:
Solid Braided Chalk, No. 0 to 3 ..... 40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50 ₱ gr. 30%

Locks— Cabinet—
Cabinet Locks ..... 33⅓@33⅓&7½%

Door Locks, Latches, &c.—
[Net prices are very often made on these goods.]
Reading Hardware Co. 50%
R. & E. Mfg. Co. 40%
Sargent & Co. ..... 40@40&10%

Elevator—
Stowell's 40%

Padlocks—
Wrought Iron ..... 75c@10c&5@80c&5%
R. & E. Mfg. Co. Wrt. Steel and Brass... 75@75&10%

Sash, &c.—
Fitch's:
Bronze and Brass 66⅔%
Iron 70%
Ives' Patent.:
Bronze and Brass 62½%
Iron 65%
Wrought Bronze and Brass ..... 55&5%
Wrought Steel 60%
Payson's Signal 80%
Reading ..... 60&10&10@70%

Machines— Boring—
Common, Upright, Without Augers, $2.00
Common, Angular, Without Augers, $2.25

Without Augers.			
R. & E. Mfg. Co.:	Upright.		Angular.
Improved No. 3.	$4.25	No. 1.	$5.00
Improved No. 4.	3.75	No. 2.	3.38
Improved No. 5.	2.75		
Jennings'... No. 4,	3.15	No. 1,	3.50
Millers' Falls.			5.75
Snell's, Rice's Pat.	2.50		2.75

Hoisting—
Moore's Anti-Friction Differential Pulley Block 30%
Moore's Hand Hoist, with Lock Brake. 20%
Moore's Portable Pneumatic Hoist.... 25%

Ice Cutting—
Chandler's ..... 15&10%

Washing—
Wayne American ..... ₱ doz. $28.00
Western Star, No. 2 ..... ₱ doz. 28.00
Western Star, No. 3 ..... ₱ doz. 30.00
St. Louis, No. 41 ..... ₱ doz. 60.00

Mallets—
Hickory ..... 45&5@50%
Lignumvitæ ..... 45&5@50%
Tinners', Hickory and Applewood, doz. ..... 50@55c

Mats— Door—
Elastic Steel (W. G. Co.) 10%

Mattocks—
See *Picks and Mattocks.*

Meat Cutters—
See *Cutters, Meat.*

Milk Cans— See *Cans, Milk*

Mills— Coffee—
Enterprise Mfg. Co ..... 25@30%
National, list Jan. 1, '94 ..... 30%
Parker's Columbia and Victor ..... 50&10@60%
Parker's Box and Side ..... 50&10@60%
Swift, Lane Bros Co. 30%

Mincing Knives—
See *Knives, Mincing.*

Molasses Gates—
See *Gates, Molasses.*

Money Drawers—
See *Drawers, Money.*

Mowers Lawn—
Net prices are generally quoted.
Cheap ..... all sizes, $1.90@1.95
Good ..... all sizes, $2.25@2.50

	10	12	14	16-inch
High Grade	4.25	4.50	4.75	5.00
Continental				60&10&5%
Great American				70&5%
Great American Ball Bearing				60&10&5%
Quaker City				70&5%
Pennsylvania				60&10&5%
Pennsylvania Golf				50%
Pennsylvania Horse				40%
Pennsylvania Pony				45%

Philadelphia:
Styles M., S., C., K., T. ..... 70&5%
Style A, all Steel ..... 65&10%
Style E, Low Wheel ..... 60&10%
Style E, High Wheel ..... 70&10&5%
Drexel and Gold Coin, low list... 50&5%

Nails—
Cut and Wire. See Trade Report.
Wire Nails and Brads, Papered. List July 20, 1899. 85&10@85&10&10%
Hungarian, Finishing, Upholsterers', &c. See Tacks.

Horse—

Nos.	6	7	8	9	10
A. C	25c	23c	22c	21c	21c... 40&5%
Ausable	28c	28c	25c	24c	23c.. 50&10%
C. B. K	25c	25c	22c	21c	21c..... 40%
Champ'in	28c	26c	25c	24c	23c..... 40&10&5%
Clinto	19c	17c	16c	15c	14c..... 30&10&5%
Maud S.	25c	23c	22c	21c	21c..... 50%
Putnam	23c	21c	20c	19c	18c..... 33⅓%
Vulcan	23c	21c	20c	19c	18c... 25&10%
American, Nos.					10c ₱ ℔ 12c
Neponset	Nos. 5 to				10c ₱ ℔ 12c
Jobbers' special brands... per lb. 8@9c					

Picture—

	1½	2	2½	3	3½ in.
Brass Head	.45	.60	.70	.95	1.00 gro.
For Head	..	1.10	1.10	..	gro.

Nippers, See *Pliers and Nippers.*

Nut Crackers—
See *Crackers, Nut.*

Nuts—
Cold Punched: Off list.
Mfrs. or U. S. Standard.
Square, plain ..... $4.70@4.80
Hexagon, plain ..... $4.90@5.00
Square, C. T. & R. ..... $4.90@5.00
Hexagon, C. T. & R. ..... $5.30@5.40
Hot Pressed:
Mfrs., U. S. or Nar. Gauge Stan'd.
Square Blank ..... $5.00@5.10
Hexagon Blank ..... $5.30@5.40
Square Tapped ..... $4.80@4.90
Hexagon Tapped ..... $5.10@5.20

Oakum—
Best or Government ..... lb. 6¼c
Navy ..... lb. 5 c
U. S. Navy ..... lb. 5¾c
Plumbers' Spun Oakum 8¾c
in carload lots ¼c lb. off f.o.b. New York.

Oil Axle—
Snow Flake:
1 pt. cans, per doz. $3.00
1 qt. cans, per doz. $4.80
1 gal. cans, per doz. $15 00
5 gal. cans, per doz. $66.00
} 33⅓&10%

Oil Tanks—See *Tanks, Oil.*

Oilers—
Brass and Copper .. 40c 10@40c 10c&5%
Tin or Steel ..... 60c 10@60c 10c&5%
Zinc ..... 60c 10@60c 10c&5%
Paragon:
Brass and Copper 40c 10%
Tin or Steel 60c 10%
Zinc 60c 10%
Malleable, Hammers' Improved, No. 1, $3.60; No. 2, $4; No. 3, $4.40 ₱ doz. 20%
Malleable, Hammers' Old Pattern, same list ..... 50&10%
Wilmot & Hobbs Mfg. Co:
Spring Bottom Cans ..... 70&70&10%
Railroad Oilers etc. ..... 60&60&10%

Openers— Can—
French ..... doz. 35c
Iron Handle ..... doz. 25@27c
Sprague, Iron Hdle., per doz. 35@40c
Sardine Scissors... doz. $1.75@3.00
Tip Top ..... per doz. $0.75
National, ₱ gro. ..... $1.75@$2.00
Stowell's ..... per doz. 35&45c
Waldorf, ₱ gro. $3.65

Egg—
Nickel Plate ..... per doz., $2.25
Silver Plate ..... per doz., $3.50

Packing—
Asbestos Packing, Wick and Rope, 15@15½c lb.

Rubber—
Sheet, C. I. ..... 8@12c
Sheet, C. O. S. ..... 9@15c
Sheet, C. B. S. ..... 10@14c
Sheet, Pure Gum ..... 50@70c
Sheet, Red ..... 35@40c
Jenkins' Standard, ₱ ℔ 80c.... 35@25&5%

Miscellaneous—
American Packing ..... 7@10c lb.
Cotton Packing ..... 13@14c lb.
Italian Packing ..... 9@12½c lb.
Jute ..... 3½@4c lb.
Russia Packing ..... 7@11c lb.

Pails— Creamery—
S. S. & Co., with gauges.. No 1 $6.50; No. 2, $5.75 ₱ doz.

Galvanized—
Price per doz.

	Quart	10	12	14
Water, Regular		1.75	2.00	2.25
Water, Heavy		3.40	3.60	3.80
Fire, Rd. Bottom		2.25	2.50	3.00
Well		2.50	....	3.00

Pans— Dripping—
Standard List.. ..... 50c 10@50c 20%

Fry—
Common Lipped:

No.	1	2	3	4	5
Per doz.	$0.60	.75	.85	.95	1.15

Roasting and Baking—
Regal, S. S. & Co., ₱ doz., Nos. 5, $4.50; 10 $5.00; 20, $5.50; 30, $6.00.
Simplex, ₱ gro., No. 40 $30.00; 50, $34.50; 60 $39 00; 140, $33.00; 150, $37.50; 160, $43.00.

Paper—Building Paper—
Asbestos: lb.
Building Felt 3c
Mill Board, sheet, 40 x 40 inches... 4c
Mill Board, roll, thicker than 1-16 inch 3c
Mill Board, roll, 1-16 in. thick and less 3c

	Per roll
Rosin Sized Sheathing:	*500 sq. ft.*
Light wt., 25 lbs. to roll	$0.40
Medium wt., 30 lbs. to roll	$0.47
Heavy wt., 40 lbs. to roll	$0.60
Medium Grades Water Proof Sheathing	$0.65@1.25
Deafening Felt, 9, 6 and 4½ sq. ft. to lb., ton	$40.00@42.00
Red Rope Roofing, 250 sq. feet per roll	$1.65

NOTE.—*These goods are often sold at delivered prices.*

Tarred Paper.
1 ply (roll 400 sq. ft.), ton.. $29.00@32.00
2 ply, roll 108 sq. ft. ..... 55@65c
3 ply, roll 108 sq. ft. ..... 77@87c
Slater's Felt (roll 500 sq. ft.)..... 70c

NOTE.—*Above prices often include delivery.*
R. R. M. Stone Surfaced Roofing (roll 110 sq. ft.) $2.75

Sand and Emery—
List Dec. 23, 1899 ..... 60@60c 10%

Parers— Apple—
Advance ..... ₱ doz. $4.50
Baldwin ..... ₱ doz. $5.00
Bonanza ..... each $5.00
Dandy ..... each $7.50
Eureka, 1898 ..... each $16.00
Family Bay State ..... ₱ doz. $12.00
Hudson's Little Star ..... ₱ doz. $4.00
Hudson's Rocking Table ..... ₱ doz $5.50
Improved Bay State ₱ doz. $27.00@30.00
New Lightning ..... ₱ doz. $5.50
Reading 72 ..... ₱ doz. $4.00
Reading 78 ..... ₱ doz. $7.00
Turn Table '98 ..... ₱ doz. $5.50
White Mountain ..... ₱ doz. $4.00

Potato—
Saratoga ..... ₱ doz. $5.50
White Mountain ..... ₱ doz. $4.50

Paris Green— *per lb.*
Arsenic kegs or casks ..... @13 c
Kegs, 100 to 175 lbs. ..... @13½c
Kits, 14, 28, 56 lbs. ..... @14½c
Paper boxes, 2 to 5 lbs. ..... @14½c
Paper boxes, 1 lb. ..... @14½c
Paper boxes, ½ lb. ..... @15½c
Paper boxes, ¼ lb ..... @16½c

Picks and Mattocks—
List Feb. 23, 1899. ..... 70@70c 10%

Pigeons— Clay
Markle's Black Birds, f.o.b. factory, per M $3.75
See also *Traps, Target.*

Pinking Irons—
See *Irons, Pinking.*

Pins— Escutcheon—
Brass ..... 60@60c 10%
Iron, list Nov. 11, '85..... 60@60c 10%

Pipe, Cast Iron Soil—
Standard, 2-6 in. ..... 65c&7½%
Extra Heavy, 2-6 in. ..... 65c&5%
Fittings ..... 70c 10c&2½%

Pipe, Merchant, Boiler Tubes, &c.—

Merchant Pipe.	*Black.*	*Galvanized*
⅛ to ½ inch	*56%*	*43%*
¾ to 12 inch	*64%*	*51%*
Boiler Tubes.	*Steel.*	*Black* *Up to 22 feet.*
1 to 1½ inch, inclusive		*45%*
2¼ to 3 inch, inclusive		*63%*
1¾ to 2½ and 6 to 13 inches		*58%*
Iron.		*Up to 22 feet.*
1 to 1½ inch and 2½ in.		*39%*
1¾ to 2¼ inch		*38%*
2¾ to 13 inch		*48%*
Casing, Cut Lengths.		*S. & S.*
2 to 3 inch		*58%*
3¼ to 4 inch		*60%*
4½ to 12½ inch		*63%*

Pipe Sewer—
Standard Pipe and Fittings, 2 to 24 in.
New England 70%
New York and New Jersey 73%
Maryland, Delaware, East Penn. 75%
West Penn and West Va. 75%
Virginia 78%
Ohio, Michigan and Ky. 8%
Carload lots are generally delivered.

Planes and Plane Irons—
Wood Planes—
Molding ..... 40c 2½@40c 10%
Bench, First quality 45c 10@45c 10c&5%
Bench, Second qual.. 50c 10@50c 10c&5%
Bailey's (Stanley R. & L. Co) ..... 25&10@25&10&10%
Chapin-Stephens Co.:
Bench, Common (Pearce) ..... 50&10@50&10&5%
Bench Extra and Pemium ..... 45&10@45&10&5%
Molding ..... 40&2½@40&10%
Gage Self Setting 35%

Iron Planes—
Bailey's (Stanley R. & L. Co) ..... 25&10@25&10&10%
Chaplin's Iron Planes ..... 50&10%
Miscellaneous Planes (Stanley R. & L. Co.) ..... 20&10@20&10&10%
Sargent's 60%

Plane Irons—
Wood Bench Plane Irons ..... 30c&5@30c 10c&5%
Buck Bros. 30%
Chapin-Stephens Co. ..... 30@30&10&5%
Stanley R. & L. Co... 20&10@20&10&10%
L. & I. J. White ..... 20&5@25%

Planters, Corn, Hand.
Kohler's Eclipse ..... ₱ doz. $9.00

Plates—
Felloe ..... lb. 3¾@4c
Self-Sealing Pie Plates (S. S. & Co.), ₱ doz. $2.00 ..... 50%

Pliers and Nippers—
Button Pliers ..... 75@75c 10%
Gas Burner, per doz., 5 in., $1.15@ $1.30; 6 in., $1.35@1.45
Gas Pipe.. 7 8 10 12-in.
$1.75 $2.00 $2.75 $3.75
Acme Nippers ..... 50@50&5%
Bernard's:
Parallel Pliers, &c. 35%
Paragon Pliers ..... 50&5%
Lodi Pliers ..... 50&5%
Elm City Fence Pliers 35%
Cronk Hanger Co.:
American Button ..... 75&10%
Cronk's 60%
Improved Button ..... 70&10%
Stub's Pattern 50%
Combination and others 25%
Heller's Farriers' Nippers, Pincers, and Tools 50&50&5%
P., S. & W. Tinnors' Cutting Nippers ..... 30@30&10%
Swedish Side, End and Diagonal Cutting Pliers 50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds 40%

Plumbs and Levels—
Plumbs and Levels ..... 75@75c 10%
Chapin-Stephens Co.:
Pocket Levels ..... 40@40&10&10%
Plumbs and Levels ..... 40@40&10&10%
Disston's Plumbs and Leve's 70%
Disston's Pocket Levels, 70&10&10@75& 0%
C. E. Jennings & Co.'s Iron ..... 25&10%
C. E. Jennings & Co.'s Iron, Adjustable. ..... 33⅓&10%
Stanley R. & L. Co ..... 40@40&10&10%
Stanley's Duplex ..... 20@20&10&10%
Woods' Extension 33⅓%

Poachers, Egg—
Buffalo Steam Egg Poachers, ₱ doz., No. 1, $7.20; No. 2, $11.00 No. 3, $11.00; No. 4, $14.50 ..... 50%

Points, Glaziers'—
Bulk and 1 lb. papers... lb. 8 c@...
½-lb. papers ..... lb. 8½c@...
¼-lb. papers ..... lb. 9 c@...

Pokes, Animal—
Ft. Madison Hawkeye ..... ₱ doz. $3.25
Ft. Madison, Western ..... ₱ doz. $3.75

Police Goods—
Manufacturers' Lists ..... 25@25&5%
Tower's 45%

Polish—Metal—
Prestoline Liquid, No. 1 (½ pt.), ₱ doz. $3.00; No. 2 (1 qt.), $9.72 ..... 40%
Prestoline Paste ..... 40&10%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ₱ doz. 50c; ₱ gr. $4.50; ½ ℔ boxes, ₱ doz. $1.25; 1 ℔ boxes, ₱ doz. $2.25.
U. S. Liquid, 8 oz. cans, ₱ doz. $1.25; ₱ gr. $12.00.
Barkeepers' Friend Metal Polish, ₱ doz. $1.75; ₱ gr. $18.00.
Wynn's White Silk, ½ pt. cans, ₱ doz. $2.00

Stove—
Black Eagle Benzine Paste, 5 ℔ cans .. ₱ ℔ 10¢
Black Eagle, Liquid, ½ pt. cans ..... ₱ doz. 75¢
Black Jack Paste, ¾ ℔ cans. ₱ gro. $9.00
Ladd's Black Beauty, gr. $10.00 ..... 50%
Joseph Dixon's, ₱ gr. $5.75 ..... 10%
Dixon's Plumbago ..... ₱ ℔ 8¢
Fireside ..... ₱ gr. $2.50
Gem, ₱ gr. $4.50 ..... 10%
Japanese ..... ₱ gr. $3.50
Jet Black ..... ₱ gr. $3.50
Peerless Iron Enamel, ½ pt. cans ..... ₱ doz. $1.50
Wynn's:
Black Silk, 5 ℔ pail ..... each 70¢
Black Silk, ½ ℔ box ..... ₱ doz. $1.00
Black Silk, 5 oz. box ..... ₱ doz. $0.75
Black Silk, ½ pt. liq. ..... ₱ doz. $1.00

Poppers, Corn—
1 qt., Square ..... gro. $7.70
1 qt., Round ..... gro. $8.25
1½ qt., Round ..... gro. 9.90
2 qt., Round ..... gro. 11.00

Post Hole and Tree Auers and Diggers—
See also *Diggers, Post Hole, &c.*

Potato Parers—
See *Parers, Potato.*

Pots— Glue—
Enameled 45%
Tinned 40%

Powder—
In Canisters:
Duck, 1 lb. each 45c
Fine Sporting, 1 lb. each 75c
Rifle, ½-lb. each 15c
Rifle, 1-lb. each 25c
In Kegs:
Duck, 6½-lb. kegs $2.25
Duck, 12½-lb. kegs $4.25
Duck, 25-lb kegs $8.00
Rifle, 6¼-lb kegs $1.25
Rifle, 12½-lb. kegs $2 25
Rifle, 25-lb. kegs $4.00
King's Semi-Smokeless:
Keg (25 ℔ bulk) $6 50
Half Keg (12½ ℔ bulk) $3.50
Quarter Keg (6¼ ℔ bulk) $1.90
Case 24 (1 ℔ cans bulk) $8.50
Half case (1 ℔ cans bulk) $4.50

King's Smokeless:	Shot Gun	Rifle
Keg (25 ℔ bulk)	$12 00	$15.00
Half Keg (12½ ℔ bulk)	6.25	7.75
Quarter Keg (6¼ ℔ bulk)	3.25	4.00
Case 24 (1 ℔ cans bulk)	14.00	17 00
Half case 12 (1 ℔ cans bulk)	7.25	8 75

Presses—
Fruit and Jelly—
Enterprise Mfg. Co. ..... 20@25%
Seal Presses—
Morrill's No. 1, per doz. $20 00 ..... 50%
Morrill's No. 2, per doz. $22 50 ..... 50%

Pruning Hooks and Shears—See *Shears.*

Pullers Nail—
Cyclops 50%
Miller's Falls, No. 3, per doz. $12.00 ..... 33⅓&10%
Pearson No. 1, Cyclone Spike Puller, each $50.00 ..... 50%
Pelican, ₱ doz. $9.00 ..... 40&10%
Samson ..... ₱ doz $18.00

Pulleys—Single Wheel—
Scranton, Case Lots:
No. 1 (large), ₱ doz. $6.50; No. 2 (large), $5.75; No 3 (small), $5.00; No. 2-B (large), $5.50; No. 3-B (small), $5.00; No. 2-D (large), $4.50; No 3-D (small) $4.00.
Smith & Hemenway Co.:
Diamond B. No. 2, case lots. ₱ doz $6.00
Diamond B, No. 3, case lots. ₱ doz $5.50
Giant, No. 1, ₱ doz. $18; No. 2, $14.50; No. 3, $15 ..... 40%

Inch	2	2½	3
Awning... doz.	*$0.50*	*.75*	*1.00*
Hay Fork, Swivel or Solid Eye ..... doz., 4 in., $0.95; 5 in., $1.15			
Inch	2	2½	2½
Hot House, doz	*$0.60*	*.80*	*1.10*
Inch	1¼	1½	1¾ 2
Screw ..... doz.	*$0.14*	*.17*	*.20 .26*
Inch	1¾	2	2¼ 2½
Side ..... doz.	*$0.27*	*.35*	*.58 .55*
Inch	1½	1¾	2 2½
Tackle ..... doz.	*$0.87*	*.37*	*.50 .89*

Stowell's:
Ceiling or End, Anti-Friction 60%
Dumb Waiter, Anti-Friction... 60&10%
Hay Fork, Anti-Friction, 5-in. Wheel, ₱ doz. $12.00 ..... 50%
Electric Light 60%
Side, Anti-Friction ..... 60&10%

Sash Pulleys—
Common Frame; Square or Round End per doz., 1¼ in., 13c; 2 in., 16c
Auger Mortise, no Face Plate, per doz. 1¼ in.. 12c.; 2 in., 15c.
Auger Mortise, with Face Plate, per doz., 1¼ in. 13c.; 2 in., 15½c.

Acme.....1¾ in., 16¢; 2 in., 19¢
Common Sense, 1¾ in.... ₱ doz., 18¢; 2 in., 20¢.
Fox-All-Steel, Nos. 3 and 7, 2¼ in. ₱ doz 25¢
No. 9, 1¾ in..... ₱ doz. 20¢
Extra for Plated Finish...₱ doz. 20¢
Extra for Anti-Friction Bronze Bushing..... ₱ doz 10¢
Grand Rapids All Steel Noiseless....40%
Ideal No. 13.....1¾ in.. ₱ doz.. 16¢
Niagara.....1¾ in., 16¢; 2 in., 19¢
No. 26, Troy....1¾ in., 14½¢; 2 in., 16½¢
Star.....1¾ in., 16¢; 2 in., 19¢
Tackle Blocks—See *Blocks.*

Pumps—

Cisterns.....60@60&10%
Pitcher Spout.....75@75&10%
Wood.....50@50&10%
Pump Leathers, Lower and Plunger Valves—Per gro.:

Inch..	2	2¼	2½	2¾
	$2.20	2.50	2.75	3.00
Inch..	3	3¼	3½	3¾	4
	$4.30	5.60	5.85	4.10	4.50

Barnes Dbl. Acting (low list).....50%
Flint & Walling's Fast Mail (low list).50%
Flint & Walling's Pitcher Spout.....75%
Loud's Suction Pumps, U. H. Co.....20%
Myer's Pumps, low list.....50%
Myers' Power Pumps.....50%
Myers' Spray Pumps.....50&10%
Contractors' Rubber Diaphragm Non-chokable, P. & L. Block Co.....30%

Punches—

Revolving (4 tubes)...doz. $3.75@4.25
Saddlers' or Drive, good..doz. 65@70c
Spring, single tube, good quality.... $1.65@1.75
Bemis & Call Co.'s Cast Steel Drive....50%
Bemis & Call Co.'s Check.....55%
Bemis & Call Co.'s Spring.....50%
Morrill's No. 1 (A.B.C.), ₱ doz., $15.00 ..50%
No. 2, ₱ doz. $22.50.....50%
No. 2, Metal, ₱ doz., $45.00.....50%
Bench Punch, each, $40.00.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Steel Screw, B & K. Mfg. Co.....40%
Tinners Hollow, P., S.& W.Co.35@35&5%
Tinners' Solid, P., S. & W.Co., ₱ doz., $1.44.....30%

Rail— Barn Door, &c.—

Cast Iron, Barn Door; Flange Screw Holes for Rd. Groove Wheels:

⅛	⅝	¾	*In.*
$1.70	$2.10	$5.00	*100 feet.*

Angular for Sq. Groove Wheels:

Small.	*Med.*	*Large.*	
$1.60	1.95	2.70	*100 feet.*

Sliding Door, Brnzed Wr't Iron, ft.6¼c
Sliding Door, Iron Painted....2½@3c
Sliding Door, Wrought Brass, 1½ in. .....lb. 36c..30%
Cronk's Double Braced Steel Rail, ₱ foot.....3½¢
Cronk's O. N. T. Rail.....3¼¢
Lanes' O. N. T., ₱ 100 ft., 1 inch, $3.10; 1¼ inch, $3.90; 1½ inch, $4.85.
Lanes' Standard, ₱ 100 ft.....3.75
Lawrence Bros'.....₱ ft. 4¼¢
McKinney's None Better.....₱ ft. 3¾¢
McKinney's Standard.....₱ ft. 4 ¢
Stowell's Cast Rail.....1½¢
Stowell's Steel Rail, Plain.....2½¢
Stowell's Wrought Bracket, Plain....3¼¢

Rakes—

Net Prices, Malleable Rakes:

	10	*12*	*14*	*16-tooth*
Shank	$1.50	1.60	1.75	1.85
Socket	$1.65	1.80	1.95	2.10

Sept. 1, 1900, List:
Cast Steel.....70¢5&2%
Malleable.....70¢10@75¢5%
Lawn Rakes, Metal Head, per doz.,
20 teeth.....$3.25@3.50
24 teeth.....$3.60@3.75
Fort Madison Red Head Lawn.....$3 25
Fort Madison Blue Head Lawn.....$3.00
Jackson Lawn, 29 and 30 teeth..... ₱ doz. $4.00
Kohler's:
Lawn Queen, 20-tooth, ₱ doz.....$3.60
Lawn Queen, 24-tooth, ₱ doz.....$3.75
Paragon, 20-tooth, ₱ doz.....$2.85
Paragon, 24-tooth, ₱ doz.....$3.00
Steel Garden, 14-tooth, ₱ doz.....$3.60
Malleable Garden, 14-tooth ₱ doz. $2 25

Rasps, Horse—

Disston's.....75%
Heller Bros.....70&5%
McCaffrey File Co. Horse Rsps.60&10&5%
New Nicholson Horse Rasp .....70&10%
See also *Files.*

Razors—

Boracle.....70%
Fox Razors, No. 42...₱ doz. $20.00 } dis. 40%
Fox Razors, No 44...₱ doz. $24.00 }
Fox Razors, No. 82, Platina, ₱ doz. $24.00
Silberstein:
Carbo Magnetic.....$18.00
Griffon, No. 05.....$15.00
Griffon, No. 00.....$12.00
All other Razors.....40%
Safety Razors.....40%

Safety Razors—

New Gem, Enameled Boxes, ₱ doz. $12 00
New Gem, Extra Razor Blades, ₱ doz. $8.35
New Gem Mustin Outfits, ₱ doz. $ 5.60
New Gem Wood Handle Strop, Machine and Strop.....₱ doz. $14.60

Razor Strops—

See *Strops, Razor.*

Reels— Fishing—

Pflueger:
M 6, Q 6, A 6, B 6, M 9¼ 4008, Silver Rubber Populo, Nickeled Populo, Aluminum, German Silver, Bronze, ₱ 04 N, 06 N, 4 N to 8 PN.....33⅓%
6 RW, 102 P and RN, 202 P and PN.40%
G 9.....20%
24 N to 28 PN.....35&10&10%
124 N, 974 PN, 002904 PN, 1020 R and PRN, 202 PR and PRN....50&5%
2904 N.....40&10&5%
5009 PN and N.....50%
2904 P.....50&10&5%
2904 PN.....60%
0924 N.....40&10%
02084 N.....45&12½&5%
Single Action Trout.....40&10%
9-8 P N. 802 and 802 N.....0&10%
Competition, 304 and 304 PN 35%
0304 P and PN.....40&5%
Safety and Salmon.....30%
Shakespeare, Style C.....25%

Registers—

List Sept. 2, 1901.

Black Jap.....
White Jap.....
Bronzed.....
Nickel Plated.....
Electro Plated.....
} 75&10@80&10%

There is a good deal of irregularity in prices of Registers.

Revolvers—

Single Action.....85@90c
Double Action, except 44 calibers..$1.50
Double Action, 44 calibers.....$1.65
Automatic.....$3.70
Hammerless.....3.90

Riddles, Grain or Sand—

16 in. per doz.....$1.95@$2.20
17 in. per doz.....$2.10@$2.35
18 in. per doz.....$2.25@$2.50

Rings and Ringers—

Bull Rings—

	2	*2½*	*3 Inch.*
Steel	$0 70	0.75	0.80 *doz.*
Copper	1.00	1.10	1.35 *doz.*

Hog Rings and Ringers—

Hill's Rings....gro. boxes, $4.00@4.50
Hill's Ringers, Gray Iron. doz. 55@60c
Hill's Ringers, Mal. Iron, doz. 75@80c
Blair's Rings.....per gro. $5.00@5.25
Blair's Ringers...per doz. $0.60@ .65
Brown's Rings....per gro. $6.00@6.75
Brown's Ringers..per doz. $0.75@1.00
Rapid Rings.....₱ gro. $6.00
Rapid Ringers.....₱ doz. $3.50

Rivets and Burrs—

Copper.....50¢10%
Iron or Steel:
Tinners'.....70@70¢10%
Miscellaneous.....70@70¢10%

Rivet Sets—See *Sets*

Roasting and Baking Pans—See *Pans, Roasting and Baking.*

Rollers—

Acme, Stowell's Anti-Friction.....50%
Barn Door, Sargent's list.....60%
Cronk's Stay.....66⅔%
Cronk's Brinkerhoff.....66⅔%
Lane's, Stay.....33⅓&5%
Stowell's Barn Door Stay...₱ doz. $1.25

Rope—

Manila, 7-16 in. and larger, tarred or untarred.....lb. 13½¢
Manila.....⅜-inch lb. 14 c
Manila.....¼ and 5-16 inch lb. 14½¢
Manila, Hay, Hide and Bale Bale Rope, Medium and Coarse.....lb. 13½¢
*Sisal, 7-16 in. and larger*lb. 10 @10½¢
Sisal.....⅜-inch..lb. 10½@1 3¼¢
Sisal, ¼ and 5-16 in. ...lb. 11 @11¼¢
Sisal, Hay. Hide and Bale Ropes, Medium and Coarse.....lb. 10½@10¾¢
Sisal, Tarred, Medium Lath Yarn.....lb. 9¼@ 9½¢
Cotton Rope:
Best.....¼-in. and larger lb. 13½¢
Medium..¼-in. and larger lb. 11 c
Com.....¼-in. and larger lb. 9 c
Jute Rope:
Thread No. 1, ¼ in. and up lb. 6½¢
Thread No. 2, ¼-in. and up lb. 6 c
Yarn, ¼ in and up..... lb. 4½c

Wire Rope—

Galvanized.....25¢7½%
Plain.....30¢7½%

Ropes, Hammock—

Covert Mfg. Co.....45&2%
Covert Saddlery Works.....60&5%

Rules—

Boxwood.....60@60¢10%
Ivory.....35¢10@35¢10¢10%
Chapin-Stephens Co.:
Boxwood.....60@60&10%
Ivory.....35&10@35&10&10%
Miscellaneous.....50&10@50&10&10%
Patent Combination.....55@55&10%
Stationers' Rulers.....10@10&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....50&10%
Stanley R. & L. Co.:
Boxwood.....60@60&10%
Ivory.....35@35&10&10%
Upson Nut Co.:
Boxwood.....60@60&10%
Ivory.....35&10@35&10&10%

Sad Irons—See *Irons, Sad.*

Sand and Emery Paper and Cloth—

See *Paper and Cloth.*

Sash Cords—See *Cord, Sash.*

Sash Locks—See *Locks, Sash.*

Sash Weights—

See *Weights, Sash.*

Sausage Stuffers or Fillers—See *Stuffers or Fillers Sausage.*

Saw Frames—See *Frames, Saw.*

Saw Sets—See *Sets, Saw.*

Saw Tools—See *Tools, Saw.*

Saws—

Atkins:
Circular.....50@50&10%
Band.....50&10@60%
Cross Cuts.....35&5%
Mulay, Mill and Drag.....50&10%
One-Man Saw.....40%
Wood Saws.....40%
Hand, Compass, &c.....40%
Chapin-Stephens Co.: Turning Saw Frames and Saws.....30@30&10%
Diamond Saw and Stamping Works:
Sterling Kitchen Saws.....25%
Disston's:
Circular Solid and Inserted Tooth.50%
Band 2 to 14 in. wide.....60%
Band ¼ to 1¾.....70%
Crosscuts.....45@45&10%
Narrow Crosscuts.....50@50&10%
Mulay, Mill and Drag.....50%
Framed Woodsaws.....35@35&7½%
Woodsaw Blades.....40@40&7½%
Woodsaw Rods.....25%
Hand Saws Nos. 12 99, 9, 16, d100, D8, 120, 76, 77, 4.....25@25&7½%
Hand Saws, Nos 7, 107, 107½, 3, 1, 0, 00, Combination.....30@30&7½%
Compass, Keyhole, &c.....25@25&7½%
Butcher Saws and Blades..35@35&7½%
C. E. Jennings & Co.'s:
Back Saws.....25&10%
Butcher Saws.....3 &10%
Compass and Key Hole Saws.35&5&10%
Frame I Wood Saws.....30&10%
Hand Saws.....20&2 &10%
Wood Saw Blades.....30&10%
Millers Falls:
Butcher Saws.....15&10%
Saw Blades.....6&10%
Peace:
Circular and Mill.....50%
Cross Cuts, list Jan. 1, '99.....50%
Hand, Panel and Rip.....30%
Richardson:
Circular and Mill.....50%
Hand, &c.....30%
X Cuts, list Jan. 1, '99.....50%
Simonds:
Circular Saws.....50%
Crescent Ground Cross Cut Saws..35%
One-Man Cross Cuts.....40&10%
Gang Mill, Mulay and Drag Saws..50%
Band Saws.....50%
Back Saws.....25@25&7½%
Butcher Saws.....35@35&7½%
Hand Saws.....25@25&7½%
Compass, Keyhole, &c.....25@25&7½%
Wood Saws.....35@35&7½%

Hack Saws—

Disston:
Concave Blades.....25%
Keystone.....30%
Hack Saw Frames.....30%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180...35&5&10%
Hack Saws, Nos. 175, 180, complete, 35&5&10%
Griffin's Hack Saw Frames ..35&5&10%
Griffin's Hack Saw Blades.....35&5&10%
Star Hack Saws and Blades.....15&10%
Sterling Hack Saw Blades.....25%
Sterling Hack Saw Frames.....20%

Scroll—

Barnes' No. 7, $15.....25%
Barnes' Scroll Saw Blades.....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment $18; with boring attachment, $20.....30%
Lester, complete, $10.00.....15&10%
Rogers, complete, $4.00.....15&10%

Scale Beams—

See *Beams, Scale.*

Scalers Fish—

Covert's Saddlery Works.....60&10%

Scales—

Family, Turnbull's.....30@30¢10%
Counter:
Hatch. Platform, ½ oz to 4 lbs. doz $5.50
Two Platforms, ½ oz to 8 lbs. doz. $16
Union Platform, Plain...$1.70@1.90
Union Platform, Striped $1.85@2.15
Chatillon's:
Eureka.....25%
Favorite.....40%
Grocers' Trip Scales.....50%
Pelouze Scales—Household, Counter, Candy, Ice, Postal, Computing.....50%
"The Standard" Portables.....45%
"The Standard" R. R. and Wagon....50%

Scrapers—

Box. 1 Handle.....*doz $2.25@2.50*
Box. 2 Handle.....*doz. $3.75@4.00*
Ship, No 1, doz $3.50; No. 2, $2.25@2.50
Adjustable Box Scraper (S. R. & L. Co.) $3.00.....30@30&10%
Chapin-Stephens Co., Box Scrapers.....50@50&10%

Screens, Window, and Frames—

Bonanza Window Screens.....60@60&5%
Flyer Pattern Window Screen..60@60&5%
Maine Window Screen Frames 40&10&5%
Perfection Window Screens.....60@60&5%
Phillips' Window Screen Frames.....60&10&5%
Porter's Hummer Window Screens.....60@60&5%
Porter's Klondike Window Screens.....60@2½@60@7½%
Wabash Spring Adj. Screen.....50%
See also *Doors.*

Screw Drivers—

See *Drivers, Screw.*

Screws—Bench and Hand—

Bench, Iron, doz, 1 in., $3.00@3.25; 1¼, $3.50@3.75. 1¼, $4.00@4.50
Bench, Wood, Beech...doz. $3.50@2.75
Hand, Wood.....30¢5@40%
Hand, R. Bliss Mfg. Co.....35%
Hand, Chapin-Stephens Co.....30@30&10%

Coach, Lag and Hand Rail—

Lag, Common Point, list Oct. 1, '99.....75¢5@...%
Coach and Lag, Gimlet Point, list Oct. 1, '99.....70@...%
Hand Rail, list Jan. 1, '81.60¢10@...%

Jack Screws—

Standard List.....75@75¢10%
Millers Falls.....50¢10&10%
Millers Falls, Roller.....50¢10%
P. S. & W.....50@50&10%
Sargent.....70¢10%

Machine—

List Jan. 1, '98.
Flat or Round Head, Iron.50@50¢10%
Flat or Round Head, Brass50@50¢10%

Set and Cap—

Set (Iron or Steel).....70%
Sq. Hd. Cap.....65%
Hex. Hd, Cap.....65%
Rd. or Fillister Hd. Cap.....60%

Wood—

List Jan. 1, 1900.
Manufacturers' printed discounts:
Flat Head, Iron.....87½@90%
Round Head, Iron.....85@87½%
Flat Head, Brass.....85@87½%
Round Head, Brass.....82½@85%
Flat Head, Bronze.....75@80%
Round Head, Bronze.....72½@77½%
Drive Screws.....87½@90%
NOTE.—*Extra 10&10&5% often given.*

Scroll Saws—See *Saws, Scroll.*

Scythes— *Per doz.*

Clipper Pattern, Grass.....$4.25
Full Polished Clipper.....$4.75
Grain.....$7.00
Clipper, Grain.....$7.50
Wood and Bush.....$4.50

Scythe Snaths—

See *Snaths, Scythe.*

Seeders— Raisin—

Enterprise.....25@30%

Sets— Awl and Tool—

Brad Awl and Tool Sets:
Wood Hdle., 10 Awls doz. $2.00@2.25
Wood Hdle., 14 Awls, 6 Tools doz. $2.50@2.60
Aiken's Sets, Awl and Tools:
No. 20, ₱ doz. $10.00.....50&10&10%
Fray's Adj. Tool Hdls...Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7.....50%
C. E. Jennings & Co.'s Model Tool Holders.....3&10%
Millers Falls Adj. Tool Hdls, No. 1, $12; No. 4, $12; No. 5, $18 .... 15&10%
Stanley's Excelsior:
No. 1, $7.50; No. 2 $4.00; No. 3, $5.50.....30@30&10&10%

Garden Tool Sets—

Ft. Madison Rakes, Shovel and Hoe.... ₱ doz.....$9.00

Nail—

Square.....*per gro. $2.50*
Round, Blk. and Pol., assorted.... gro. $1.80@2.50
Octagon.....*gro, $4.25@4.75*
Knurled, Good.....*gro, $5.00@6.50*
Buck Brothers.....27½%
Cannon's Diamond Point, ₱ gr. $12..25%
Mayhew's.....per gro. $9.00
Snell's Corrugated, Cup Pt. per gro, $7.50
Snell's Knurled, Cup Pt.....per gro $7.50

Rivet—

Regular list.....70@70¢10¢5%

Saw—

Aiken's:
Genuine.....50&10%
Imitation.....50&10%
Atkin's:
Criterion.....40%
Adjustable.....40%
Bemis & Call Co's.:
Cross Cut.....30%
Hammer, new Pat.....45%
Plate.....20%
Spring Hammer.....30%
Disston's Star and Monarch.....25%
Morrill's No. 1, $15.00.....50%
Nos. 3 and 4, Cross Cut, $20.63.....50%
No. 5, Mill, $30.00.....50%
Nos. 10, 11, 95, $15.63.....50%
No. 1 Old Style, $10.00.....50%
Taintor Positive, ₱ doz. $18.....60%

Sharpeners, Knife—

Chicago Wheel & Mfg. Co.....65%
Smith & Hemenway Co.....70&5%
Tanite Mills ₱ gross, $14.40....25@33⅓%

Sharpeners Skate—

Eureka Skate Sharpener.....₱ doz. $2.00

Shaves Spoke—

Iron.....*doz. $1.00@1.25*
Wood.....*doz. $1.75@2.00*
Bailey's (Stanley R. & L. Co.).....50&50&10&10%
Chapin-Stephens Co.....50@50&10&10%
Goodell's, ₱ doz. $9.00.....15&10%
Wood's F1 and F2.....50%

Shears—

Cast Iron... 7 8 9 *in.*

Best	$16.00	18.00	20.00 *gro.*
Good	$13.00	15.00	17 00 *gro.*
Cheap	$5.00	6.00	7.00 *gro.*

Straight Trimmers, &c.:
Best quality, Jap.....70@70¢10%
" *Nickel*.....60@60¢10%
Fair qual. Jap.....80@80¢5%
" *Nickel*.....75@75¢10%
Tailors' Shears.....40@40¢10%
Acme Cast Shears.....40@40&5%
Heinisch's Tailors' Shears.....40%
Wilkinson's Hedge.....50%
Wilkinson's Sheep.....1900 list, 50%

Tinners' Snips—

Steel Blades.....20¢10%
Steel Laid Blades.....40¢10%
Forged Handles, Steel Blades, Berlin.. 40@40&10%
Jennings & Griffin Mfg. Co's. 6¼ to 10 inch.....40&7½&10%
Niagara Snips.....40%
P. S. & W. Co.....30%

Pruning Shears and Tools—

Cronk's Grape Shears.....33⅓%
Cronk's Pruning Shears.....33⅓%
Disston's Combined Pruning Hook and Saw, ₱ doz. $18.00.....25@25&10%
Disston's Pruning Hook, ₱ doz. $12.00 25@25&10%
John T. Henry Mfg. Company
Pruning Shears, all grades..40@40&5%
Orange Shears.....50&10@50&20%
Grape.....40&10@50%
Tree Pruners.....75%
Nagley's Pruning Shears.....10&5%
P. S. & W. Co.....33⅓%

Sheaves—Sliding Door—

Stowell's Anti-Friction.....50%
Patent Roller Hatfield's, Sargent's list. 70&10%
Reading.....70&10@75%
R. & E. list.....33⅓%
Wrightsville, Hatfield Pattern.....80%

Sliding Shutter—

Reading list.....70&10@75%
R. & E. list.....33⅓%
Sargent's list.....50&10%

Shells—Shells, Empty—

Brass Shells, Empty:
First quality, all gauges.....60&5%
Climax, Club, Rival, 10 and 12 gauge 65&5%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Magic 10, 12, 16 and 20 gauge..25&5%
Blue Rival, New Climax, Challenge, Monarch, Defiance, New Victor, Repeater, Yellow Rival, 10, 12, 16 and 20 gauge.....20%
Climax, Union, League, New Rival 10 and 12 gauge.....25%
Climax, Union, League, New Rival, 14, 16 and 20 gauge ($7.50 list)..20%
Expert Metal Lined and Pigeon, 10, 12, 16 and 20 gauge.....33⅓&5%

Shells, Loaded—

Loaded with Black Powder.....40¢5%
Loaded with Smokeless Powder, medium grade.....40¢10%
Loaded with Smokeless Powder, high grade.....40¢10¢10¢5%

Shoes, Horse, Mule, &c.—

F. o. b., Pittsburg.
Iron.....*per keg $3.90*

Steel.....per keg 2.35
Burden's, all sizes, ₱ keg.....$3.60

Shot—
Drop, up to B, 25-lb. bag.....$1.35
Drop, B and larger, per 25-lb. bag $1.60
Buck, 25-lb. bag.....$1.60
Chilled, 25-lb. bag.....$1.60
Dust Shot, 25-lb. bag.....$2.10
Markle's Chilled.....$1.60
Raymond Chilled.....$1.90

Shovels and Spades—
Association list, March, 1902.....40%

Sieves and Sifters—
Hunter's Imitation, gro. $11.00@11.50
Buffalo Metallic Blued, S. S. & Co., ₱ gr.:

14&16	16&18	18&20
$12.00	$13.80	$15.00

F. A. Meyers' Mfg. Co.:
Eclipse.....₱ gr. $11.00
Electric Light.....₱ gr. $11.00
Hunter's Genuine.....₱ gr. $12.50
No Name, Hunter's.....₱ gr. $11.00
Standard.....₱ gr. $11.00
Shaker (Barler's Pat.) Flour Sifters.. ₱ doz., $2.00.....30%

Sieves, Tin Rim—
Per dozen

Mesh	14	16	18	20
Black, full size	$0 95	.98	1.00	1.10
Plated, full size	$1.05	1 08	1.10	1.20
Black, scant	$0.78	.80	.83	

Sieves, Wooden Rim—
Nested, 10, 11 and 12 Inch.
Mesh 18, Nested, doz.....$0.65@0 75
Mesh 20, Nested, doz.....75@ .85
Mesh 24, Nested, doz.....90@1.00

Sinks—
Cast Iron—
Standard list .....65@7½%
NOTE.—*There is not entire uniformity lists used by jobbers.*

Wrought Steel—
New Era, Galv'd and Enameled...70&5%
New Era, Painted.....60&10%
L. & G. Mfg. Co., Galvanized.....50%
L. & G. Mfg. Co., Enameled.....50%

Skeins, Wagon—
Cast Iron.....70@10@75%
Malleable Iron.....40@10@50%
Steel.....40@50&10%

Slates—
Factory Shipments.
"D" Slates.....50@10@10@10%
Unexcelled, etc., Noiseless Slates, 6 to 8 tens %
Victoria, etc., Noiseless Slates, 6 to 7 tens %
Wire Bound.....50@10@5%
Web Hinge.....5%

Slaw Cutters—See *Cutters.*

Slicers, Vegetable—
Sterling $2.00.....33⅓

Snaps, Harness—
German.....40@50@10%
Covert Mfg. Co.:
Derby.....35&2%
High Grade.....45&2%
Jockey.....40&2%
Trojan.....45&2%
Yankee.....35&2%
Yankee, Roller.....30&2%
Covert's Saddlery Works:
Crown.....60%
German.....60%
Model.....60%
Triumph.....60%
W. & E. T. Fitch Co.:
Bristol.....40&10%
Empire.....50&5%
German.....40%
National.....50&5%
Perfect.....40
Clipper.....50&5%
Champion.....40%
Security.....40%
Victor.....60&5%
Oneida Community:
Solid Steel.....60&5%
Solid Swivel.....60%
Bargent's Patent Guarded.....66⅔&10%

Snaths—
Scythe.....50@50&10%

Snips, Tinners'—See *Shears*

Soldering Irons—
See *Irons, Soldering.*

Spoke Trimmers—
See *Trimmers, Spoke.*

Spoons and Forks—
Silver Plated—
Good Quality.....50@10@60@10@5%
Cheap.....60@60@10%
International Silver Co.:
1847 Rogers Bros. and Rogers & Hamilton.....40&10%
Rogers & Bro., William Rogers Eagle Brand.....50&10%
Anchor, Rogers Brand.....60%
Wm. Rogers & Son.....60&10%
Simeon L. & Geo. H. Rogers Co.:
Silver Plated Flat Ware.....60%
No. 17 Silver Plated Ware.....60&10%

Miscellaneous—
German Silver.....60@10@50@10@10%
Cattaraugus Cutlery Co.:
Yukon Silver.....50%
Simeon L. & Geo. H. Rogers Co.:
German or Nickel Silver, Special list 1 & 10%

Tinned Iron—
Teas.....per gro. 45@5.5c
Tables.....per gro. 90c@$1.60

Springs—Door—
Gem (Coil).....20%
Star (Coil).....30%
Torrey's Red, 39 in.....₱ doz. $1.10
Victor (Coil).....59&10&10%

Carriage, Wagon, &c.
1¼ in. and Wider:
Black or ⅛ Bright, lb.....5 c
Bright, lb.....5½c
Painted Seat Springs:
1½ x 2 x 26 and smaller, per pr 48@53c
1½ x 2 x 28 per pr.....56@61c
1½ x 3 x 28 and narrower, per pr. 75@80c
Cliff's Springs:
Bolster.....40%
Seat.....per pair, 50c
Pole..per pair, ⅝ in. $1.10; ¾ in. $1.25

Sprinklers, Lawn—
Enterprise.....25@20%
Philadelphia No. 1, ₱ doz. $12; No. 2, $15; No. 3, $24.....30%

Squares—
Nickel plated.....} List Jan. 5, 1900.
Steel and Iron.....} 70&10%
Rosewood Hdl Try Square and T-Bevels.....60@10@10@70%
Iron Hdl. Try Squares and T-Bevels, 40@10@40@10@10%
Disston's Try Sq. and T-Bevels.....60&10%
Winterbottom's Try and Miter.....40&10@40&10&10%

Squeezers—Lemon—
Wood, Common, gro., No. 0, $5.25 @$5.50; No. 1, $6.25@$6.50.
Wood, Porcelain Lined.
Cheap.....doz. $2.00@2.75
Good Grade.....doz. $3.00@3.50
Tinned Iron.....doz. $0.75@1.25
Iron, Porcelain Lined doz. $2.50@3.25

Staples—
Barbed Blind.....lb. 6@7½c
Electricians', Association list.....80@10 @10&10%
Fence Staples, same price as Barbed Wire. See Trade Report.
Poultry Netting, Staples....per lb.. 2¼@2½c
Grand Crossing Tack Co.'s list....80&10%

Steels, Butchers'—
Dick's.....30%
Foster Bros'.....30%
Hartzell Cutlery Co.....60&5%
C. & A. Hoffmann's.....40%

Steelyards.....25@25@10%

Stocks and Dies—
Blacksmiths'.....40@40@10%
Gardner Die Stocks No. 1.....50%
Gardner Die Stocks, larger sizes.....40%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plates.....25@10%
Curtis Reversible Ratchet Die Stock.25%

Stone—
Scythe Stones—
Chicago Wheel & Mfg. Co:
Gem Corundum, 10 inch, $8.00 per gro., 12 inch, $10.80
Pike Mfg. Co. 1901 list:
Black Diamond S. S....₱ gro. $12.00
Lamoille S. S.....₱ gro. $11.00
White Mountain S. S....₱ gro. $9.00
Green Mountain S. S....₱ gro. $6.00
Extra Indian Pond S. S.₱ gro. $7.50
No. 1 Indian Pond S. S.₱ gro. $7.00
No. 2 Indian Pond S. S.₱ gro. $4.50
Leader Red End S. S.₱ gro. $4.50
Balance of 1901 list 33⅓%

Oil Stones, &c.
Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit.....50%
Gem Corundum Axe, Single or Double Grit.....55%
Gem Corundum Slips.....55%
Gem Corundum Razor Hones.....50%
Pike Mfg. Co. 1901 list: ₱ lb
Arkansas Stone, No. 1, 3 to 5½ in. $2.80
Arkansas Stone, No. 1, 5½ to 8 in. $3.50
Arkansas Slips No. 1.....$4.00
Lily White Washita 4 to 8 i.....60¢
Rosy Red Washita, 4 to 8 in.....60¢
Washita Stone, Extra, 4 to 8 in..50¢
Washita Stone, No. 1, 4 to 8 in..40¢
Washita Stone, No. 2, 4 to 8 in..30¢
Lily White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
India Oil Stones (entire list).....25%
Hindostan No. 1, Regular....₱ lb 80¢
Hindostan No. 1 Small.....₱ lb 100¢
Axe Stones (all kinds).....33⅓%
Turkey Oil Stones, ex. 5 to 8 in. ₱ lb 80¢
Queer Creek Stones, 4 to 8 in.....20¢
Queer Creek Slips.....40¢
Sand Stone.....40%
Belgian, German and Swaty Razor Hones.....40%
Natural Grit Carving Knife Hones, ₱ doz.....$3.00
Quick Edge Pocket Knife Hones, ₱ doz.....$2.40
Mounted Kitchen Sand Stone, ₱ doz.....$1.80
Tanite Mills:
Emery Oil, ₱ doz. $5.00.....50@60%

Stoners—
Cherry—
Enterprise.....25@30%

Stops, Bench—
Millers Falls.....15&10%
Morrill's...₱ doz., No. 1, $10.00.....50%
Morrill's, No. 2, $12.50.....50%

Plane—
Chapin-Stephens Co.....20%

Window—
Ives' Patent.....25&5%

Stove Boards—
See *Boards, Stove.*

Stove Polish—See *Polish, Stove.*

Strainers, Pump—
Diamond Joe Pump Strainers..per doz. 75¢

Straps—
Box—
Cary's Universal, case lots.....20&10%
Hame—
Covert's Saddlery Works.....60&10%

Stretchers, Carpet—
Cast Iron, Steel Points...doz. 55@65c
Socket.....doz. $1.75

Strops, Razor—
Smith & Hemenway Co.....70%

Stuffers, Sausage—
Enterprise Mfg. Co.....25@25&7½%
National Specialty Mfg. Co., list Jan. 1, '97.....30%

Sweepers, Carpet—
National Sweeper Co.: Per doz
Marion, Roller Bearing, regular finishes, full Nickel.....$24.00
Marion Queen, Roller Bearing, Fancy Veneers, full Nickel.....$27.00
Monarch, Roller Bearing, Nickel.....$22.00
Monarch, Roller Bearing, Japan'd.$21.00
Marion Queen, Roller Bearing, Regular Finishes, full Nickel.....$24.00
Transparent, Roller Bearing, Plate Glass Top, Nickel.....$32.00
Monarch Extra, Roller Bearing, (17-inch case), Nickel.....$36.00
Monarch Extra, Roller Bearing (17-inch case), Japanned.....$33.00
Perpetual, Regular Bearings, Nkl. $30.00
Perpetual, Regular Bearings, Jap. $27.00
NOTE.—*Discount of 50c per dozen on three-dozen lots. Discount of $1 per dozen on five-dozen lots.*

Tacks Brads, &c.—
List Jan. 15, '99.
Carpet Tacks, American.90@25@....%
American Cut Tacks....90@30@....%
Swedes Iron Tacks....90@30@....%
Swedes Upholsterers' Tacks.....90@40@....%
Gimp Tacks.....90@50@....%
Lace Tacks.....90@40@....%
Trimmers' Tacks.....90@25@....%
Looking Glass Tacks.....70@10%
Bill Posters' and Railroad Tack.....90@40@....%
Hungarian Nails.....80@15%
Common and Patent Brads.....80@10%
Trunk and Clout Nails.....80@5%
NOTE.—*The above prices are for Straight Weights.* An extra 5% is given Star Weights** and an extra 10@2½ on Standard Weights.****

Miscellaneous—
Double Point Tacks.....80@6 or 7 tens
Steel Wire Brads, R. & E. Mfg. Co.'s list.....50@10@60%
See also *Nails, Wire.*

Tanks, Oil—
Emerald, S. S. & Co.....30-gal. $3.20
Emerald, S. S. & Co.....60-gal. $4.00
Queen City S. S. & Co., 0-gal.....$3.50
Queen City S. S. & Co., 60-gal.....$4.25

Tapes, Measuring—
American Asses' Skin.....40@10@50%
Patent Leather.....25@30@5%
Steel.....40@40@5%
Chesterman's.....25@25@5%
Eddy's Steel.....40@40&5%
Eddy's Metallic.....33⅓@33⅓&5%
Keuffel & Esser Co., Steel and Metallic, Lowee list, 1899.....35%
Lufkin's Steel.....33⅓@35%
Lufkin's Metallic.....30@30&5%

Teeth, Harrow—
Steel Harrow Teeth, plain or headed, base per lb.....2¼c

Thermometers—
Tin Case.....80@10@80@10@5%

Ties, Bale—Steel Wire.
Single Loop.....80@80@10%
Improved, Monitor, Cross Head, Etc.....70%

Ties, Wall—
Cleveland Wire Spring Co.:
Galv. Steel 5-32 x 6½ in. ₱ 1000, $10.00
Galv. Steel 5-32 x 8½ in. ₱ 1000, $11.00
Galv. Steel 5-32 x 11½ in. ₱ 1000, $12.00
Galv. Steel 5-32 x 15½ in. ₱ 1000, $14.00

Tinners' Shears, &c.—
See *Shears, Tinners', &c.*

Tinware—
Stamped, Japanned and Pieced, sold very generally at net prices.

Tips, Safety Pole—
Covert's Saddlery Works.....60&10%

Tire Benders, Upsetters, &c.—See *Benders and Upsetters, Tire.*

Tobacco Cutters—
See *Cutters, Tobacco.*

Tools—
Coopers'—
L. & I. J. White.....20@20&5%
Saw—
Atkins' Cross Cut Saw Tools.....40%
Simonds' Improved.....33⅓%
Simonds' Crescent.....25%
Ship—
L. & I. J. White.....25%
Transom Lifters—
See *Lifters, Transom.*
Traps—Fly—
Balloon, Globe or Acme.....doz. $1.15@1.25; gro. $11.50@12.00
Harper, Champion or Paragon doz. $1.25@1.50; gro. $13.00@13.50
Game—
Oneida Pattern.....75@10@5@30@5%
Newhouse.....45&45&5%
Hawley & Norton.....65&5@65&10%
Victor (Oneida Pattern).....75@75&5%
Star (Blake Pattern).....60&5@60&10%
Mouse and Rat—
Mouse, Wood, Choker, doz. holes.....8½@9c
Mouse, Round or Square Wire.....doz. $0.85@1.00
American Pattern French Rat and Mouse Traps—
No. 1, Detroit Marty Pattern, ₱ doz. $4.50; in ½ gro. lots, ₱ doz.....$4.00
No. 2, Detroit Marty Pattern, ₱ doz. $3.25; in ½ gro. lots, ₱ doz.....$3.00
Detroit Marty Pattern Mouse, ₱ doz. $2.00; in ½ gro. lots, ₱ doz.....$1.75
Diamond Joe Mouse Traps....per doz. 60c
Diamond Joe Rat Traps.....per doz. $1.00
Marty French Rat and Mouse Traps (Genuine)
No. 1, Rat, Each $1.12½; ₱ doz. $12.00
No. 3, Rat, ₱ doz. $6.00; case of 50 $5.25 doz.
No. 3½, Rat, ₱ doz. $4.75; case of 72 $4.25 doz.
No. 4, Mouse, ₱ doz. $3.50; case of 72 $2.75 doz.
No. 5, Mouse, ₱ doz. $2.75; case of 150 $2.25
Schuyler's Rat Killer, No. 1, ₱ gr. $30.00; No. 2, ₱ gr. $20.00; Mouse, No. 3, $18.00.....50%

Target—
Markle's, each.....$5.50

Trimmers, Spoke—
Bonney's Nos. 1 and 2.....40%
Wood's No. 1.....50%

Trowels—
Diston Brick and Pointing.....30%
Diston Plasterers'.....25%
Diston "Standard Brand" and Garden Trowels.....40%
Never-Break Steel Garden Trowels.....gro. $7.00
Peace's Plastering.....30%
Rose Brick and Plastering.....25&5%
Woodrough & McFarlin, Pl'st'ring....25%

Trucks, Warehouse, &c.—
B. & L. Block Co.:
New York Pattern.....50&10%
Western Pattern.....60&10%
Handy Trucks.....per doz. $16.00
Daisy Stove Trucks, Improved pattern ₱ doz. $18.50
Model Stove Trucks.....₱ doz. $18.50

Tubs, Wash—

	No. 1	2	3
Galvanized, per doz.	*$5.00*	*5 50*	*6.00*
Galvanized Wash Tubs (S. S. & Co.):			
No.	1	2	3	10	20	30
Per doz.	$5 25	6.00	6.75	6.50	7.25	8.00

Twine—
Miscellaneous—

Flax Twine—	*BC*	*P.*
No. 9, ¼ and ½-lb. Balls	*21½c*	*23½c*
No. 12, ¼ and ½ lb. Balls	*17½c*	*19½c*
No. 18, ¼ and ½-lb. Balls	*15½c*	*17½c*
No. 24, ¼ and ½-lb. Balls	*15 c*	*17 c*
No. 36, ¼ and ½-lb. Balls	*14½c*	*16½c*

Chalk Line, Cotton, ½-lb Balls.....22@22½c
Cotton Mops, 6, 9, 12 and 15 lb. to doz.....7@8c
Cotton Wrapping 5 Balls to lb ... according to quality.....11c@17c
American 2-Ply Hemp, ¼ and ½-lb. Balls.....13@14c
American 3 Ply Hemp, 1-lb. Balls.. 13@14c
India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine).....7½c
India 3-Ply Hemp, 1-lb. Balls... 7½c
India 3-Ply Hemp, 1½-lb. Balls.. 6½c
2, 3, 4 and 5-Ply Jute, ½-lb. Balls... 8@9c
Mason Line, Linen, ½-lb. Balls...15c
No. 2½ Mattress, ¼ and ½-lb. Balls 37c
Wool, 3 to 6 ply.....5c

Vises—
Solid Box.....50@50&10%

Parallel—
Athol Machine Co.:
Simpson's Adjustable.....40%
Standard.....40%
Amateur.....25%
Bonney's.....40%
Columbian Hdw Co.....40%
Fisher & Norris Double Screw....15&10%
Hollands':
Machinists'.....40%
Key tone.....65&5%
Lewis Tool Co.....30@33⅓%
Massey's Perfect.....15@20%
Massey's:
Clincher.....30@40%
Combination, Quick Adj.....40%
Woodworker's.....15%
Merrill's.....30%
Miller's Falls.....50&10&10%
Parker's:
Victor.....20@25%
Regulars.....30@25%
Vulcan's.....40@45%
Combination Pipe.....55@60%
Prentiss.....20@25%
Sargent's.....40%
Snedliker's X. L.....33⅓%
Stephens'.....33⅓%

Saw Filers—
Bonney's, No. 1, $13; No. 3, $16.....50%
Disston's D 3 Clamp and Guide, ₱ doz. 830.....25%
Reading.....60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3.....45&50%

Miscellaneous—
Bignall & Keeler Combination Pipe Vise.....60%
Parker's Combination Pipe:
87 Series.....60%
187 Series.....60&5%
No. 870.....40%

Wads—Price Per M.

B. E., 11 up	*60c*
B. E., 9 and 10	*70c*
B. E., 8	*80c*
B. E., 7	*80c*
P. E., 11 up	*$1.00*
P. E., 9 and 10	*1.25*
P. E., 8	*1.50*
P. E., 7	*1.50*
Ely's B. E., 11 and larger	*$1.70@1.75*
Ely's P. E., 12 to 20	*$3.00@3.25*

Dis. 15%

Wagon Jacks—
See *Jacks, Wagon.*

Ware, Hollow—
Aluminum—
S. S. & Co. Reduced List.....40%

Cast Iron, Hollow—
Stove Hollow Ware:
Ground.....65%
Unground.....70%
White Enameled Ware:
Maslin Kettles.....70&10@70%
Covered Ware:
Tinned and Turned.....40@10@10&10@7%
Enameled and Plain.....50@50&10@5%
See also *Pots, Glue.*

Enameled—
Agate Nickel Steel Ware, list Nov. 1, '01.....50&10%
Iron Clad Ware.....70&10%
Never Break Enameled....50&5@50&10%

Tea Kettles—
Galvanized Tea Kettles:

Inch	*6*	*7*	*8*	*9*
Each	*55c*	*60c*	*55c*	*65c*

Steel Hollow Ware.
Avery Spiders & Griddles.....65@65&5%
Avery Kettles.....60%
Porcelained.....50&5@50&10%
Never Break Spiders and Griddles.....65&5%

Never Break Kettles..... 60%
Solid Steel Spiders & Griddles.....65&5%
Solid Steel Kettles.....60%
Solid Steel Ware, Enameled ..... 50&5%

Washboards—

Solid Zinc: ₱ doz
Crescent, family size, bent frame..$3.00
Red Star, family size, stationary protector.....$3.00
Double Zinc Surface:
Saginaw Globe, family size, stationary protector.....$2.65
Cable Cross, family size, stationary protector.....$2.90
Single Zinc Surface:
Nalad, family size, open back perforated.....$2.40
Saginaw Globe, protector, family size, ventilated back $2.25
Brass Surface:
Brass King, Single Surface, open back $3.00
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.00

Washers—

Leather, Axle—

Solid.....85¢10¢10@85¢10¢10¢10%
Patent.....85¢10@85¢20%
Coil: ¾ 1 1¼ 1¾ *Inch.*
10c 11c 12c 13c *per 100*

Iron or Steel—

Size bolt ... *5-16* ⅜ ½ ⅝ ¾
Washers....$5.70 5.00 3.70 3.50 3.40
In lots less than one keg add ½c per lb., 5-lb. boxes add ½c to list.

Cast Washers—

Over ½ inch, barrel lots, per lb..... 1½@1¾c

Washer Cutters—

See *Cutters, Washer.*

Washing Machines—

See *Machines, Washing.*

Water Coolers—

See *Coolers, Water.*

Wedges—

Oil Finish.....*lb, 2.90@3.10c*

Weights—

Hitching—

Covert's Saddlery Works.....60&10%

Sash—

Per ton, f.o.b. factory:
Eastern District.....$20.00@21.00
Western, Central and Southern Districts.....$21.50@23.00

Well Buckets, Galvanized

See *Pails, Galvanized.*

Wheels, Well—

8-in., $1.45@1.65; 10-in., $1.75@2.00
12-in., $2.35@2.50; 14-in., $3.50@3.75

Wire and Wire Goods—

Bright and Annealed:
6 to 9.....72½¢5@72½¢10%
10 to 18.....72½¢10@72½¢10¢5%
19 to 26.....75¢10¢2½@75¢10¢7½%
27 to 36.....75¢10¢7½@8¢2½%
Galvanized:
6 to 18.....70@70¢5%
19 to 26.....72½¢5@72½¢10%
27 to 36.....72½¢10@72½¢10¢5%
Copper:
6 to 9.....70¢5@70¢10%
10 to 18.....70¢10@70¢10¢5%
19 to 26.....75¢1½@75¢10¢2½%
27 to 36.....75¢10@75¢10¢5%
Tinned:
6 to 14.....75@75¢7½%
15 to 18.....72½¢5@73%
19 to 26.....70¢5@70¢5¢5%
27 to 36.....70@70¢5%
Annealed Wire on Spools..70¢5@70¢10%
Brass and Copper Wire on Spools, 60¢5@60¢10%
Brass, list Feb. 26, '96.....20%
Copper, list Feb. 26, '96.....15%
Cast Steel Wire.....50%
Stubs' Steel Wire.....$6.00 to £..40%
Wire Clothes Line, see *Lines.*
Wire Picture Cord, see *Cord.*

Bright Wire Goods—

List April 1, 1901.....85¢10%

Wire Cloth and Netting—

Galvanized Wire Netting..80¢90@85%
Painted Screen Cloth per 100 ft..$1.10
Light Hardware Grade:
2-18 Mesh, Plain (8c. list) sq. ft... 1¼@1¾c
2-18 Mesh, Galv. (8c. list) sq ft 2¼@2¾c

Wire, Barb—See *Trade Report.*

Wire Rope—See *Rope, Wire.*

Wrenches—

Agricultural.....70¢10@75¢5%
Cane lots.....75¢10%
Acme.....60&10%
Alligator.....70%
Baxter's S.....60&10%
Bull Dog.....70%
Bemis & Call's:
Adjustable S.....35&5%
Adjustable S Pipe.....40%
Brigg's Pattern.....30&10%
Combination Black.....40&5%
Combination Bright.....40%
Cylinder or Gas Pipe.....55%
Extra Heavy.....45%
Merrick's Pattern.....50%
No. 3 Pipe, Bright.....55%
Bindley Automatic.....30%
Boardman's.....33⅓%
Coes' Genuine.....40&10&5&5%
Coes' "Mechanics'".....40&10&10&5&5%
Donohue's Engineer.....40&10%
Eagle.....50&10%
Elgin Wrenches.....40%
Elgin Monkey Wrench Pipe Jaws...33⅓%
Gem Pocket.....30%
Hercules.....70%
Knife Handle, Machinists' (W. & B.):
Case lots.....50&10%
Less than case lots.....50&5%
Improved Pipe (W. & B.).....60%
Solid Handles, P.S. & W.....50@50&5%
Stillson.....65%
Triumph.....60&10%
Vulcan Chain.....50%

Wrought Goods—

Staples, Hooks, &c., list March 17 '02.....90@90¢10%

Yokes, Neck—

Covert Saddlery Works, Trimmed..70%
Covert Saddlery Works, Neck Yoke Centers.....70%

Yokes, Ox, and Ox Bows—

Fort Madison's Farmers & Freighters'.. list net

Zinc—

Sheet.....*lb* 6¼c@6¾c

PAINTS, OILS AND COLORS—Wholesale Prices.

White Lead, Zinc, &c.

Lead, English white, in Oil... .. 7¾@ 9¾
Lead, American White, in Oil:
Lots of 500 ℔ or over..... ..@ 6
Lots less than 500 ℔..... ..@ 6½
Lead, White, in oil, 25 ℔ tin pails, add to keg price..... ..@ ½
Lead, White, in oil, 12½ ℔ tin pails, add to keg price..... ..@ 1
Lead, White, in oil, 1 to 5 ℔ assorted tints, add to keg price.. ..@ 1½
Lead White, Dry in bbls..... 5½@ 6
Lead, American, Terms: On lots of 500 lbs. and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.
Zinc, American, dry..... ₱ ℔ 4¾@ 4¾
Zinc, Paris, Red Seal, dry..... .. @ 8¾
Zinc, Paris, Green Seal, dry..... .. @ 9¾
Zinc, Antwerp Red Seal, dry..... .. @ 6½
Zinc, Antwerp, Green Seal, dry .. @ 8¾
Zinc, V. M. French, in Poppy Oil, Green Seal:
Lots of 1 ton and over.....12 @12½
Lots of less than 1 ton.....12¾@12¾
Zinc, V. M. French, in Poppy Oil, Red Seal:
Lots of 1 ton and over.....10¾@11¼
Lots of less than 1 ton.....11@11½
Discounts.—V. M. French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

Dry Colors.

Black, Carbon.....₱ ℔ 5 @ 8
Black, Drop, Amer..... 4 @ 7
Black, Drop, Eng..... 7 @11
Black, Ivory.....12 @21
Lamp, Com..... 4½@ 6
Blue, Celestial.....₱ ℔ 4 @ 6
Blue, Chinese.....30 @35
Blue, Prussian.....28 @34
Blue, Ultramarine..... 4 @20
Brown, Spanish..... ½@ 1
Brown, Vandyke, Amer..... 1¾@ 2½
Brown, Vandyke, Foreign..... 2½@ 3½
Carmine, No. 40..... ...₱ ℔ $2.05@2.75
Green, Chrome, ordinary..... 5 @ 6½
Green, Chrome, pure .....10 @2)
Lead, red, bbls. ½ bbls. and kegs:
Lots 500 ℔ or over..... .. @ 5½
Lots less than 500 ℔..... @ 6
Litharge, bbls. ½ bbls. and kegs:
Lots 500 ℔ or over..... .. @ 5½
Lots less than 500 ℔..... @ 6
Ocher, French Washed..... 1½@ 1⅞
Ocher, Dutch Washed..... 4¾@ 5
Ocher, American... ₱ ton $10.00@15.00
Orange Mineral, English.. ₱ ℔ 8 @10½
Orange Mineral, French..... 11¾@ ..
Orange Mineral, German..... 8¼@10½
Orange Mineral, American .... 7¾@ 8
Red, Indian, English..... 4½@ 8½
Red, Indian, American..... 3 @ 3¼
Red, Turkey, English..... 4 @ 6
Red, Tuscan, English..... 7 @10
Red, Venetian, Amer., ₱ 100 ℔. .50@1.50
Red Venetian, English ₱ 100 ℔ 1.80@2.00
Sienna, Italian, Burnt and Powdered.....₱ ℔ 3½@ 7½
Sienna, Ital., Raw, Powd..... 3½@ 7½
Sienna, American, Raw..... 1¾@ 2
Sienna, American, Burnt and Powdered .....₱ ℔ 1¾@ 2
Talc, French.... .....₱ 100 ℔ $1.25@1.50
Talc, American.....90 @1.10
Terra Alba, French, ₱ 100 ℔ .95 @1.00
Terra Alba, English .....95 @1.00
Terra Alba, American No. 1....95 @95
Terra Alba, American No. 2....45 @50
Umber, Turkey, Bnt. & Pow. ₱ ℔ 2½@ 3½
Umber, Turkey, Raw & Powd. 2½@ 3½
Umber, Bnt. Amer..... 1½@ 2
Umber, Raw, Amer..... 1½@ 2
Yellow, Chrome .....10¾@25
Vermilion, American Lead.....10 @10
Vermilion, Quicksilver, bulk ... @70
Vermilion, Quicksilver, bags.... @71
Vermilion, English, Import.. .80 @95
Vermilion, Chinese.... ..$1.05@1.20

Colors in Oil.

Black, Lampblack..... 12 @14
Blue, Chinese..... 36 @40
Blue, Prussian..... @35
Blue, Ultramarine..... 13 @16
Brown, Vandyke..... 9¼@13
Green, Chrome..... 10 @12
Green, Paris..... @21
Sienna, Raw..... 10 @13
Sienna, Burnt..... 10 @13
Umber, Raw..... 9½@12
Umber, Burnt..... 9½@12

Miscellaneous.

Barytes, Foreign, ₱ ton....$19.00@21.00
Barytes, Amer. floated..... 19.00@20.00
Barytes, Crude, No. 1..... 9.00@10.00
Chalk, in bulk.....₱ ton 2.50@ 2.60
Chalk, in bbls .....₱ 100 ℔ ...@ .35
China Clay, English.. ₱ ton 12.00@17.50
Cobalt, Oxide.....₱ 100 ℔ 2.20@ 2.50
Whiting, Common. ₱ 100 ℔ .40@ .60
Whiting, Gilders..... .45@ .65
Whiting, extra Gilders'.... .55@ .68

Putty.

In bladders.....$2.25
In bulk..... .....2.25
In cans, 1 ℔ to 5 ℔..... .....3.25
In cans 12 ℔ to 25 ℔..... .....2.25

Spirits Turpentine.

In Southern bbls.... .....40½@50
In machine bbls .....50 @50½¢

Glue.

Cabinet.....11½@16
Extra White.....18 @23
French.....12 @40
Irish.....13½@16
Low Grade.....₱ ℔ 9 @12
Medium White.....14½@16½

Animal, Fish and Vegetable Oils.

Linseed, City, raw.....₱ gal..66 @67
Linseed, City, boiled..... 68 @69
Linseed, State and West'n, raw.65 @66
Linseed, raw Calcutta seed..... ..@85
Lard, Prime..... 70 @80
Lard, Extra No. 1..... .....62 @68
Lard, No. 1..... .....55 @60
Cotton-seed, Crude..... .. @ ..
Cotton-seed, Summer Yellow, prime..... .....45 @46
Cotton-seed Summer Yellow, off grades..... .. ..43½@44½
Sperm, Crude..... .. @ ..
Sperm, Natural Spring..... 71 @73
Sperm, Bleached Spring..... 74 @76
Sperm, Natural Winter..... 75 @77
Sperm, Bleached Winter..... 78 @80
Tallow, Prime..... 62 @64
Whale, Crude..... .. @ ..
Whale, Natural Winter..... 46 @47
Whale, Bleached Winter..... 48 @49
Menhaden, Crude, Sound..... .. @ ..
Menhaden, Light Strained..... 32 @33
Menhaden, Bleached Winter... 34 @35
Menhaden, Ex Bleached Winter 36 @37
Cocoanut, Ceylon..... 7¼@ 7¾
Cocoanut, Cochin..... 8¼@ 8¾
Cod, Domestic..... 33 @34
Cod, Newfoundland..... 36 @40
Red Elaine..... @42
Red Saponified.....₱ ℔ 6½@ 7
Olive, Italian, bbls..... 53 @ 55
Neatsfoot, prime..... 60 @65
Palm, prime, Lagos.....₱ ℔ 5½@ 6

Mineral Oils.

Black, 40 gravity, 25@30 cold test.....₱ gal. 9¾@ 10¼
Black, 29 gravity, 15 cold test. 10¾@ 11¾
Black, summer..... 9¼@ 9¾
Cylinder, light filtered..... 14¾@17¾
Cylinder, dark filtered..... 11¾@15¾
Paraffine, 903-907 gravity..... 12¼@12¾
Paraffine, 903 gravity..... 11¾@11¾
Paraffine, 883 gravity..... 9½@10
Paraffine, red, No. 1..... 12¾@12¾
In small lots ½¢ advance.

THE IRON AGE

The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.

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CURRENT METAL PRICES.

JUNE 18, 1902.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report

IRON AND STEEL—

Bar Iron from Store—

Refined Iron:
1 to 1¾ in. round and square } ₱ lb 2.15@2.20¢
1½ to 4 in. x ⅜ to 1 in. }
1½ to 4 in. x ¼ to 5-16 ₱ lb 2.20@2.30¢
Rods—⅝ and 11-16 round and square. ₱ lb 2.40@2.50¢

Angles:	Cts ₱ lb
3 in. x ¼ in. and larger	2.75@3.00
3 to 3½ in. x 3-16 in.	2.85@3.00
½ to 3 in. x ⅛ in.	3.00
1½ to 2¾ in. x 3-16 in and thicker	2.70
1 to 1¾ in. x 3-16 in	2.80
1 to 1¾ x ⅛ in.	2.80
⅝ x ⅛ in.	3.00
¾ x ⅛ in.	3.10
⅝ x ⅛ in.	3.70
½ x 3-32 in.	4.50

Tees:	
1 in.	3.20¢
1¼ in.	3.10¢
1½ in. and larger	3.00@3.25¢
Beams	3.00@3.25¢
Channels, 3 in. and larger	3.00@3.25¢
Bands—1½ to 6 x 3-16 to No. 8	₱ lb 2.40¢
"Burden's Best" Iron, base price	₱ lb 3.30¢
Burden's "H. B. & S. Iron, base price	₱ lb 3.10¢
"Lister"	₱ lb 3.15¢
Norway Bars	3.75@4.25¢
Norway Shapes	4.00@4.50¢

Merchant Steel from Store—

	per lb
Bessemer Machinery	2.10 to 2.20¢
Toe Calk, Tire and Sleigh Shoe	2.30@3.00¢
Best Cast Steel, base price in small lots	7½¢

Soft Steel Sheets—

¼ inch	2.40¢	No. 14	3.00¢
3-16 inch	2.50¢	No. 16	3.10¢
No. 8	2.60¢	No. 18	3.50¢
No. 10	2.70¢	No. 20	3.50¢
No. 12	2.90¢	No. 22	3.60¢

Sheet Iron from Store.

Black.

	One Pass, C. R. Soft Steel	R. G. Cleaned.
Nos. 14 to 16	₱ lb, 3.35	3.40¢
Nos. 18 to 21	₱ lb, 3.45	3.50¢
Nos. 22 to 24	₱ lb, 3.50	3.60¢
Nos. 25 and 26	₱ lb, 3.60	3.70¢
No. 27	₱ lb, 3.70	3.80¢
No. 28	₱ lb, 3.80	3.90¢

Russia, Planished, &c.

Genuine Russia, according to assortment ₱ lb 11@14¢
Patent Planished ₱ lb A, 11¢; B, 10¢, net.

Galvanized.

Nos. 14 to 16	₱ lb, 3.45@3.60¢
Nos. 18 to 20	₱ lb, 3.70@3.90¢
Nos. 22 to 24	₱ lb, 4.00@4.20¢
No. 26	₱ lb, 4.25@4.50¢
No. 27	₱ lb, 4.55@4.80¢
No. 28	₱ lb, 4.85@5.10¢
No. 30	₱ lb, 6.00@6.30¢

No. 20 and lighter, 36 inches wide, 25¢ higher.

Foreign Steel from Store—

Best Cast	₱ lb 15 ¢
Extra Cast	₱ lb 18 @ 20 ¢
Swaged, Cast	₱ lb 16 ¢
Best Double Shear	₱ lb 15 ¢
Blister, 1st quality	₱ lb 13 ¢
German Steel, Best	₱ lb 10 ¢
2d quality	₱ lb 9 ¢
3d quality	₱ lb 8 ¢
Sheet Cast Steel, 1st quality	₱ lb 15 ¢
2d quality	₱ lb 14 ¢
3d quality	₱ lb 12 ¢
R. Mushet's "Special"	₱ lb 46 ¢
" " Annealed	₱ lb 75 ¢
" " "Titanic"	₱ lb 19 ¢
Hobson's Choice XX Extra Best	₱ lb 35 ¢
Jessop Self Hardening	₱ lb 45 ¢
Seamans' "Nelson" Steel	40 ¢
Hobson's "Soho" Special Self-Hardening	₱ lb 43 ¢

METALS—

Tin—

Duty.—Pigs, Bars and Block. Free.	Per lb
Banca, Pigs	31 @32 ¢
Straits, Pigs	31 @32 ¢
Straits in Bars	32 @33 ¢

Tin Plates—

American Charcoal Plates.

Calland Grade:	
IC, 14 x 20	$6.75
IX, 14 x 20	8.25
Melyn Grade:	
IC, 14 x 20	6.25
IX, 14 x 20	7.75
Allaway Grade:	
IC, 14 x 20	5.75
IX, 14 x 20	6.85

American Coke Plates—Bessemer—

IC, 14 x 20 108 lb $4.75@4.90
IX, 14 x 20 $5.80@5.95

American Terne Plates—

IC, 20 x 28 $10.00
IX, 20 x 28 $12.00

Tin Boiler Plates, American—

XX, 14 x 26 112 sheets $12.00
XX, 14 x 28 112 sheets 13.00
XX, 14 x 31 112 sheets 14.50

Copper—

DUTY: Pig, Bar and Ingot and Old Copper free Manufactured, 2½¢ ₱ lb.

Ingot—

Lake 13 @13½¢
Casting 12¾@13 ¢

Sheet and Bolt—

February 2, 1902. Net.

Prices, in cents per pound. Sheet 30 x 60.

Not wider than	Not longer than	And longer than	64 oz. & over, 50 lb. sheet, 30 x 60 and heavier.	32 oz. to 64 oz. 25 to 50 lb.	24 oz. to 32 oz. 18¾ to 25 lb.	16 oz. to 24 oz. 12½ to 18¾ lb.	14 oz. and 15 oz. 11 to 12½ lb.	12 oz. and 13 oz. 9½ to 11 lb.	10 oz. and 11 oz. 7½ to 9⅛ lb.	8 oz. and 9 oz. 6¼ to 7⅛ lb.	Lighter than 8 oz.
Ins.	Ins.	Ins.									
30	72	.....	18	18	18	18	19	20	21	24	27
30	96	72	18	18	18	18	19	21	24	27	
30	.....	96	18	18	18	18	20	24			
36	72	.....	18	18	18	18	20	22	25	28	
36	96	72	18	18	18	18	20	24	27		
36	120	96	18	18	18	19	21				
36	.....	120	18	18	19	20					
48	72	.....	18	18	19	20	22	25	28		
48	96	72	18	18	19	21	23	26			
48	120	96	18	18	20	22	26				
48	.....	120	18	19	21	24					
60	72	.....	18	18	19	21	24	29			
60	96	72	18	18	20	22	27				
60	120	96	18	19	21	24					
60	.....	120	19	20	22	26					
72	96	.....	18	19	21	26					
72	120	96	18	20	23	28					
72	.....	120	19	21	26						
108	96	.....	19	21	24						
108	120	96	20	22	25						
108	.....	120	21	23	27						
wider than 108	132	.....	22	24							
	.....	132	24	23							

Rolled Round Copper, ¾ inch diameter and over, ₱ lb 18¢.
Circles, Segments and Pattern Sheets, 3¢ ₱ lb advance over price of Sheet Copper required to cut them from.
Cold or Hard Rolled Copper 14 oz. ₱ square foot and heavier, 1¢ ₱ lb over the foregoing prices.
Cold or Hard Rolled Copper, lighter than 14 oz. ₱ square foot, 2¢ ₱ lb over the foregoing prices.
All Polished Copper, 20 in. wide and under, 1¢ ₱ lb advance over the price for Cold Rolled Copper.
All Polished Copper, over 20 in. wide, 2¢ ₱ lb advance over the price for Cold Rolled Copper.

Planished Copper—

1¢ ₱ lb more than Polished Copper.

Copper Bottoms, Pits and Flats—

14 oz. to square foot and heavier, ₱ lb 32¢
12 oz. and up to 14 oz. to square foot, ₱ lb 33¢
10 oz. and up to 12 oz., ₱ lb 35¢
Lighter than 10 oz., ₱ lb 38¢
Circles less than 8 in. diameter, 2¢ ₱ lb additional
Circles over 13 in. diameter are not classed as Copper Bottoms.
Polished Copper Bottoms and Flats, 1¢ ₱ lb extra.

Copper Wire—

Hard and Soft Drawn—B. & S. Gauge.
List Feb. 20, 1901.

Nos.	0000 to 0 Base	9 and 10		11 and 12
		¼¢		¼¢ ₱ lb adv.
Nos.	13	14	15	16
	¼¢	¾¢	1¢	1¼¢ ₱ lb adv.
Nos.	17	18	19	20
	1½¢	2¢	2½¢	2¾¢ ₱ lb adv.

Seamless Brass Tubes—

Standard always Stubs' gauge, unless otherwise ordered.
Feb. 6, 1899. Net.

Stubs' W. G.	B. & S. W. G.	Outside Diameter. ¼	5-16	⅜	7-16	½	9-16	⅝	¾	⅞	1	1¼	1½
4-11	3- 9	...	.....	...	.....	33	31	30	29	28	27	25	24
12	10	...	.....	37	35	33	31	30	29	28	27	25	24
13	11	...	.....	37	35	33	31	30	29	28	27	25	24
14	12	...	41	37	35	33	31	30	29	28	27	25	24
15	13	...	42	38	36	33	32	31	30	30	28	26	25
16	14	...	43	39	37	34	33	32	31	30	29	26	25
17	15	...	44	40	38	35	34	33	32	31	30	27	26
18	16	61	46	42	39	36	35	34	32	31	30	28	27
19	17	62	47	43	40	37	36	35	34	33	32	30	29
20	18-19	64	49	44	41	39	38	37	36	35	34	32	31
21	20	66	51	46	43	41	40	39	38	37	36	35	34
22	21	71	56	48	44	42	41	40	39	38	37	37	36
23	22	76	61	50	46	44	43	42	41	40	39	39	39
24	23	81	66	53	48	46	45	44	43	41	40	40	41
25	24	86	71	56	51	49	47	46	45	43	43	44	45

Copper Bronze and Gilding Tube, 3¢ ₱ lb additional

Iron Pipe Sizes—Brass

⅛	¼	⅜	½	¾	1	1¼	1½	2	2½	3	3½	4	4½	5	6 inch
36	32	29	27	21	21	21	21	21	21	21	23	23	25	27	28 ₱ lb

Copper, Bronze or Gilding Tubes, 3¢ ₱ lb additional

Brazed Brass Tubing.

(*To No. 19, inclusive.*) Jun 6, 1895.
Brown & Sharpe's gauge standard.

	Per lb.
Plain Round Tube, ¾ in. up to 2 in.	$0.35
" " " ⅞ " ⅝ "	.36
" " " 1 " ⅝ "	.38
" " " 1 " ⅞ "	.41
" " 5-16 " ½ "	.48
" " " ½ " 5-16"	.65
" " 3-16 " ¼ "	1.00
" " " ¼ " 3-16"	1.50
Smaller than ¼ inch	Special
2 inch to 3 inch, to No. 19, inclusive	.45
3 inch	.40
Over 3 inch to 3½ inch, inclusive	.45
Over 3½ inch	.50

Bronze and Copper, advance on Brass List, 3 cents.
Discount from list 40%

Roll and Sheet Brass—

(*Brown & Sharpe Standard Gauge.*)

Common High Brass Wider than and including	in. 2 12	in. 12 14	in. 14 16	in. 16 18	in. 18 20	in. 20 22	in. 22 24	in. 24 26
To No. 20 inclusive	.22	.23	.25	.27	.29	.31	.33	.36
Nos. 21 22, 23 and 24	.23	.24	.26	.28	.30	.32	.34	.37
Nos. 25 and 26	.23	.24½	.27	.29	.31	.33	.35	.38
Nos. 27 and 28	.23	.25	.28	.30	.32	.34	.33	.39

Common High Brass Wider than and including	in. 26 28	in. 28 30	in. 30 32	in. 32 34	in. 34 36	in. 36 38	in. 38 40	in. 40
To No. 20, inclusive	.39	.42	.46	.50	.55	.00	.65	*
Nos. 21, 22, 23 and 24	.40	.43	.47	.51	.56	.61	.68	
Nos. 25 and 26	.41	.44	.48	.52	.57	.63	.71	
Nos. 27 and 28	.42	.45	.49	.53	.58	.65	.75	

* Special prices not less than 80 cents.
Add ½¢ ₱ lb additional for each number thinner than Nos. 28 to 38 inclusive. Discount from List 30%

Wire in Coils. List February 26, 1896.

Brown & Sharpe's gauge the standard.	Com. high brass.	Low brass.	Gild'g bronze and copper
All Nos. to No. 10, inclusive	$0.23	$0.27	$0.28
Above No. 10 to No. 16	.23½	.27½	.28½
No. 17 and No. 18	.24	.28	.32
No. 19 and No. 20	.25	.29	.33
No. 21	.26	.30	.34
No. 22	.27	.31	.35
No. 23	.28	.32	.36
No. 24	.30	.34	.38
No. 25	.32	.36	.40
No. 26	.35	.39	.43
No. 27	.38	.42	.46
No. 28	.42	.46	.51
No. 29	.45	.49	.54
No. 30	.48	.52	.62
No. 31	.51	.55	.67
No. 32	.55	.59	.73
No. 33	.59	.63	.82
No. 34	.64	.68	.95
No. 35	.70	.74	1.30
No. 36	.76	.80	1.50
No. 37	1.00	1.04	1.70
No. 38	1.30	1.34	2.00
No. 39	2.00	2.00	3.25
No. 40	2.60	2.60	5.75

Discount, Brass Wire, 35%; Copper Wire, NET.
List November 16, 98.
Spring Wire, 2¢ ₱ lb advance.

Tobin Bronze—

Straight, but not turned, Rods, ⅝ to 3 in. diameter, ₱ lb, net 17¢
Finished Piston Rods, ⅝ to 2½ in. diameter, ₱ lb net, 18¢
Other sizes and extreme lengths, special prices.

Spelter—

DUTY: In Blocks or Pigs, 1¢ ₱ lb
Western Spelter 5¼@5⅝¢

Zinc.

Duty: Sheet, 2¢ ₱ lb.
600 lb casks 6¼¢ | Per lb 6¾@7¢

Lead.

Duty: Pigs and Bars and Old, 2½¢ ₱ lb. Pipe and Sheets, 2¾¢ ₱ lb.

American Pig	4.45@4½¢
Bar	5 @5½¢
Pipe	6½¢ 20% off
Tin Lined Pipe	12½¢ 20% off
Block Tin Pipe	42½¢ 20% off
Sheet Lead	7¼¢ 20% off

Old Lead in exchange, 3¼¢ ₱ lb.

Solder.

½ & ½ guaranteed 20 @20½¢
No. 1 17½@19 ¢

Prices of Solder indicated by private brand vary according to composition.

Antimony—

Duty, ¾¢ ₱ lb.

Cookson	₱ lb 10½@10¾¢
Hallett's	₱ lb 8¼@8⅜¢
U. S.	₱ lb 8¼@8½¢

Aluminum—

Duty: Crude, 8¢ ₱ lb. Plates, Sheets, Bars and Rods, 13¢ ₱ lb.

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting:
Small lots ₱ lb 37¢
100-lb lots ₱ lb 35¢
No. 2 Aluminum (guaranteed to be over 90% pure), in ingots for remelting:
Small lots ₱ lb 34¢
100-lb lots ₱ lb 33¢
Aluminum Sheet, B. & S. gauge. 50 lb or more

Wider than	6-in.	14-in.	24-in.
And including	14-in.	24-in.	30-in.
	₱ lb.	₱ lb.	₱ lb.
Nos. 13 to 19	$0.42	$0.44	$0.47
No. 20	.44	.46	.49
Nos. 21 to 23	.46	.48	.51
No. 24	.46	.50	.53
No. 25	.47	.51	.54
No. 26	.47	.54	.59
No. 27	.48	.57	.62
No. 28	.48	.57	.64
No. 29	.49	.60	.69
No. 30	.50	.64	.77

Note.—Lots of less than 50 lb 5¢ ₱ lb extra.

Aluminum Wire, B. & S. Gauge.

Larger than No. 9	₱ lb 40¢	No. 15	₱ lb 43¢
No. 9 to No. 10	₱ lb 40½¢	No. 17	₱ lb 50¢
No. 11	₱ lb 41 ¢	No. 18	₱ lb 55¢
No. 12	₱ lb 41½¢	No. 19	₱ lb 60¢
No. 13	₱ lb 42 ¢	No. 20	₱ lb 65¢
No. 14	₱ lb 42½¢	No. 21	₱ lb 85¢

Old Metals.

Dealers' Purchasing Prices Paid in New York.

Heavy Copper	₱ lb 10¼¢
Light and Tinned Copper	₱ lb 9¼¢
Heavy Brass	₱ lb 8¼¢
Light Brass	₱ lb 6½¢
Lead	₱ lb 3½¢
Tea Lead	₱ lb 3¼¢
Zinc	₱ lb 2½¢
No. 1 Pewter	₱ lb 18 ¢
No. 2 Pewter	₱ lb 9 ¢
Pure Aluminum, Sheet	₱ lb 22¢
Cast Aluminum	₱ lb 17¢
Tin Plate Scrap	₱ ton $5.00
Wrought Scrap Iron	₱ gross ton $13.00@13.50
Heavy Cast Scrap	₱ gross ton $12.00@12.50
Stove Plate Scrap	₱ gross ton $ 8.50@ 9.00
Burnt Iron	₱ gross ton $ 7.00@ 7.25